

OPERATIONAL REQUIREMENTS DOCUMENT
FOR MEDICAL COMMUNICATIONS FOR COMBAT CASUALTY CARE (MC4)

1. General Description of Operational Capability.

a. Introduction - The Need.

(1) Combat Health Support (CHS) information management forward of the division rear boundary has not significantly changed since World War II. Automated medical information systems have not been developed for incorporation into the current Standard Army Management Information Systems (STAMIS). Paper requisitions, paper reports, chart boards, voice requests, and "stubby pencil" work are the primary tools used by all forward CHS personnel. These manual processes are inadequate to support the medical information and CHS needs of the Force XXI and Army, 2010 and beyond commander. This inadequate support is exacerbated as the battle space continues to expand and non-linear operations, with increased maneuver and operational tempo (OPTEMPO), become the norm. Digital enablers/digital tools are absolutely necessary to maintain a responsive CHS system, and to maintain the low died of wounds (DOW) rates seen over the last several years.

(2) At echelons above division (EAD) stand-alone medical information management systems, often referred to as stovepipe systems, have been fielded. These stovepipe systems have improved automated medical information management within selected EAD medical units, but are not linked together or with other Army, Service, or Joint systems, making it extremely difficult and not practical for commanders to access the simplest CHS information. In this regard, the management of CHS information is years behind the management of information for all of the other combat service support (CSS) commodity areas. A seamless automated system is needed to streamline the collection, processing, storage, and transmission of medical information in a theater of operations, and to enable the combat commander to utilize this time-sensitive medical information to influence the execution of current operations.

(3) The 8 November 97 Presidential Directive specified in Public Law 105-85, National Defense Authorization Act for FY 98 states, in part, that the results of all medical examinations conducted, all health care services (including immunizations)

received by service members in anticipation of deployment or during the deployment, and records of events occurring in the deployment area that may affect the health of such members shall be maintained in a centralized location to improve future access to their records. Current manual medical records systems are ineffective and frequently unavailable during deployments. Virtually all of this critical medical information is currently documented on paper, after the fact. These paper records, with their inherent bulk and vulnerability, are easily lost, destroyed, and do not lend themselves to any sort of automated screening. In order to become a part of a soldier's permanent medical record, the pieces of paper must be physically transported back to the soldier's home station and then physically placed in that record. Because of weight and storage limitations, it is impossible to maintain a high level of paper documentation during an operational deployment. Recent examples include Desert Storm, Somalia and Bosnia where immunization and treatment records lacked completeness, reliability and were frequently missing.

(4) This concept documents the need for the development, validation/testing, integration, procurement, and fielding of an Army medical information system capable of solving the challenges outlined above. The Medical Communications for Combat Casualty Care (MC4) concept is designed to not only advance medical automated information management with the rest of the Army CSS systems, but also to set the stage for leap ahead capability in areas such as integration with the emerging Warfighter systems (Land, Mounted and Air) and the Warfighter Physiological Status Monitor (WPSM). The MC4 system will not duplicate the capabilities of other existing or emerging Army or Joint systems. Requirements are designed to fill Army medical system gaps to provide a seamless theater CHS network in order to fully support the Force XXI and Army, 2010 and beyond commander. The MC4 system, at end state, is envisioned to be fully interoperable with other Army automated systems to afford commanders a common situational picture. The MC4 system will standardize capabilities between garrison/fixed health care operations and deployable combat health support. This will significantly reduce the "train-up" time required for the Professional Officer Filler System medical personnel as well as Reserve Component medical units. The goal is that Army medical business practices be standardized between Table of Organization and Equipment (TOE) and Table of Distribution and Allowances (TDA) medical units, and also with the other armed services' medical "business practices". This capability significantly

enhances the Army and Joint Commanders' ability to conduct broad spectrum operations in the joint environment and meets, well in advance, the Department of Defense (DOD) requirement to field jointly compatible systems.

(5) A Doctrine, Training, Leader Development, Organizations, Materiel, and Soldiers (DTLOMS) determination analysis was completed and non-materiel alternatives were judged to be inadequate. This analysis was discussed in the Mission Need Statement (MNS). The MC4 system is mission essential. Its loss will stop the flow of CHS information into the Combat Service Support Control System (CSSCS). The mission essential resource in the MC4 system is the data resident in the functional modules. Mission critical nodes are located at servers with the brigade surgeon, the division surgeon, the corps surgeon, and the Army theater surgeon.

b. Warfighter Benefits - The Advantage.

(1) Ultimately, the MC4 system will significantly improve the Force XXI commander's ability to:

(a) Rapidly deploy a healthy and fit force by reducing deployment processing time to minutes rather than hours or days by providing automated tools for the purpose of recording, reporting, and then validating deployment readiness.

(b) Reduce combat mortality and morbidity by providing CHS personnel with automated tools that enhance their ability to locate and respond to wounded or injured soldiers in seconds rather than minutes or hours. Studies indicate that approximately 30% of those who are KIA have the potential of being saved through rapid, technically qualified intervention.

(c) Account for wounded/injured soldiers while in the CHS system through an automated in-transit visibility interface between the CHS system and the personnel system.

(d) Synchronize the CHS effort with the overall CSS effort by providing near real time digital CHS information on the 10 CHS functional areas through Global Combat Support System-Army (GCSS-A) or directly to CSSCS.

(e) Provide force health protection through trend analysis of health care encounters (diagnoses) and improved environmental and occupational health surveillance by providing command surgeons and preventive medicine experts with immediate

digital access to this information.

(f) Order and manage medical supplies from the battalion aid station to CONUS using a digital medical logistics (MEDLOG) system in concert with the Battlefield Distribution System. These enablers will allow for the reduction of forward medical stockages from approximately 10 days of supply (DOS) to 5 DOS along with elimination of the Division Medical Supply Office (DMSO) and 10 associated personnel. The EAD Class VIII stockages will also see a 50% reduction.

(g) Control subordinate medical units. Medical C4I units equipped with the MC4 system are projected to increase their span of control from 3-5 subordinate units to 5-7 subordinate units due to the efficiencies of digital enablers.

(h) Transition to a joint environment due to the standardization of CHS business practices and capabilities, as well as streamlined flow of relevant medical information between the Services.

(2) The MC4 system also sets the foundation for CHS of Strike Force and Army, 2010 and beyond. The concepts outlined in this document are absolutely essential to the successful execution of the basic tenets of Army, 2010 and beyond and Strike Force warfighting concepts because of their dependence on Force XXI concepts as a foundation. As the Army moves to the future, regardless of the concept, as long as soldiers are involved, the CHS basic functions must still be accomplished. The 10 CHS functions include: Medical Command, Control, Communications, Computers and Intelligence (C4I); Medical Logistics and Blood Management; Preventive Medicine; Veterinary/Food Inspection Services; Laboratory Support/Environmental Hazards Testing; Hospitalization; Forward Casualty Resuscitation and Treatment/Area Support; Dental Health; Medical Evacuation; and Combat Stress Control support. Assured telecommunications and digital tools provide a reach back capability and development of a more streamlined/tailored approach to deployment of CHS personnel.

c. Assumptions.

(1) The basic tenets of Force XXI and, in-turn, its reliance on digital enablers will not significantly change.

(2) The basic concepts outlined for Strike Force and Army, 2010 and beyond do not significantly change.

(3) The Warfighter Information Network (WIN) communications infrastructure will be fielded on time with specified capability.

(4) The Theater Medical Information Program (TMIP) will provide joint medical software on time with specified capability.

(5) The GCSS-A will continue to mature to provide interoperability between the MC4 system and the other Army/Joint digital systems.

(6) All services will field a high-capacity electronic storage device, suitable for storing medical encounter data, to their deployed personnel.

(7) Medical data collected, stored, and transmitted by the MC4 system will maintain its traditional unclassified status. This does not limit the classification of medical data received and aggregated from the MC4 system.

d. Capstone Requirements Document (CRD) Linkages: The MC4 program does not have a CRD. It does provide the Army infrastructure to support the requirements documented in the Joint TMIP CRD. It also falls under the Information Dissemination Management (IDM) CRD. Annex D shows the crosswalks between the TMIP and IDM requirements from the TMIP and IDM CRDs and the MC4 requirements from this ORD.

e. System Overview - The Medical Digital Network.

(1) The MNS, titled Medical Communications for Combat Casualty Care, was approved by the Department of the Army on 18 September 1995. The MNS validated a requirement for a program to link the CHS together into a seamless medical situational awareness and support information system with the goal of significantly enhancing combat casualty care and situational understanding while utilizing the standard Army communications infrastructure. The Army Medical Department (AMEDD) captured its over-arching concept for support of Force XXI in the approved Training and Doctrine Command (TRADOC) Pamphlet (PAM) 525-50, Military Operations Combat Health Support, dated 1 October 1996. Medical tenets addressed in the reference were used in the redesign of medical units under the Medical Reengineering Initiative (MRI). These units will begin fielding in FY 2000. The MRI units were designed to use the enhanced telecommunications and digital enablers that would be available

on the Force XXI battlefield. The concept for the MC4 system is contained in TRADOC Pam 525-50.

(2) Business Process Reengineering. In addition to the DTLOMS assessment cited in the MNS, the AMEDD Center and School developed a "To Be", C4I Integrated Definition 0 (IDEFO) model. The "To Be" model depicts the activities and the information required to facilitate the delivery of quality health care across the continuum of care in support of Force XXI. The model provided a standardized blueprint depicting information flow among the medical functional areas for use on the future battlefield. The model identified key issues (digitization, integration, and standardization) which needed to be addressed. It further provided another analysis tool to determine that non-materiel alternatives were judged to be inadequate to accommodate medical information requirements for the future.

(3) The MC4 system will be achieved by the integration of emerging information management technologies with existing and emerging digital telecommunications technologies. This new medical information management system will start with the individual soldier and continue throughout the health care continuum. The best way to visualize the MC4 system capability is as a piece of the Army digital computer network where all 10 CHS functional (or business) areas have been digitized and this CHS information is freely shared with everyone with a need to know. The MC4 system will provide Army commanders with Army CHS information and will provide them with a seamless transition to the joint CHS environment. The TMIP is the software program that will deliver the CHS specific software for the MC4 system along with standardizing software business practices DOD wide. To date, over 3,000 software requirements have been specified to TMIP for the digitization of the 10 CHS functional areas.

(4) Any worldwide medical information network developed must meet the following over-arching tasks derived from an analysis of the MC4 system MNS.

(a) Automate the 10 AMEDD functional areas.

(b) Standardize the information exchange between the medical information system and existing or emerging Army systems such as CSSCS, GCSS-A, and Force XXI Battle Command Brigade and Below (FBCB2) to avoid redundancy and the development of a stovepipe system.

(c) Interoperable with existing and emerging Army

digital telecommunication systems, such as the WIN and the Tactical Internet (TI), in order to transfer digital information.

(d) Provide digital medical information to the commander in a usable form. The medical business systems must link to the Army command and control systems such as CSSCS either directly or through an interface with Global Combat Service Support - Army (GCSS-A).

(e) Interface with the medical information systems of the other armed services, through the use of common TMIP software, to ensure that continuity of medical care and the documentation of medical care are not interrupted as a casualty passes through medical treatment facilities operated by different services. This interface operates not only between the services, but also between the operational theater and the sustaining base.

(5) The MC4 system will enhance the Army Battlefield Operating Systems (BOS) primarily by providing medical situational awareness and medical unit status data. The MC4 system contributions to the BOS are depicted in table 1 which shows the various effects of MC4 on the seven Army BOS. The impacts of MC4 on the BOS are as follows:

(a) Interoperability: MC4 will be interoperable with Army systems for information exchange and to complete the CSS operational picture.

(b) Combat Readiness: MC4 will assist commanders in determining combat readiness of his personnel and unit.

(c) Decision Making: MC4 will provide medical situational awareness information.

(d) Synchronization: MC4 will provide medical information that tactical commanders can use to synchronize operations.

(e) Mental Agility: MC4 will provide tactical commanders with medical information that will enhance his ability to rapidly plan for an operation.

(f) Clearing the battlefield: MC4 will assist in clearing the battlefield.

(g) Maneuver: MC4 will provide medical situational

awareness that could affect the scheme of maneuver.

(h) Visibility: MC4 will provide the location of medical units, evacuation assets, and critical medical supplies.

(i) Logistics: MC4 will help expedite the requisition, resupply and management of Class VIII (medical supplies).

(j) OPTEMPO: MC4 will provide medical information that can help determine the rate and frequency at which operations can occur.

(k) Integrated Info: MC4 will provide medical information, which can complete the situational awareness picture.

(l) Medical Anchor Desk: MC4 will have a medical analysis tool to assist in planning medical support for the plan of operations.

(m) Rapid NBC assessment: MC4 will provide real-time information collected from force health protection units concerning NBC hazards potentially affecting maneuverability and enemy capability.

(n) Project, protect, sustain: MC4 will provide medical situational awareness that can be used by commanders in planning combat health support for his unit.

(o) Information Dominance: MC4 will be part of the CSS STAMIS that provides the CSS operational picture for the commander.

(p) Shape battlespace: MC4 will provide medical information that can be used by commanders in planning a scheme of maneuver or dispersion on the battlefield.

(q) Conduct decisive operations: MC4 will provide medical situational awareness information that can assist the tactical commander in planning operations.

Table 1: MC4 System Impact Across the Battlefield Operating Systems (BOS)

f. Type of System Proposed.

(1) The MC4 system will be a theater, automated CHS system that will link commanders, health care providers, and medical support providers, at all echelons, with integrated medical information. The system will provide digital enablers to connect, both vertically and horizontally, all ten CHS functional areas. The MC4 system will receive, store, process, transmit, and report medical command and control, medical surveillance, casualty movement/tracking, medical treatment, medical situational awareness, and MEDLOG data across all levels of care. This will be achieved through the integration of a suite of medical information systems linked through the Army data telecommunications architecture. The MC4 system will be developed incrementally through the rapid prototyping and the spiral development process, which will progress the system from limited functional threshold capabilities to fully integrated objective capabilities.

(2) The MC4 program will serve two major functions:

(a) It will develop the Army's infrastructure for the utilization of the Joint TMIP software, and

(b) It will develop or integrate with Army unique digital enablers such as, but not limited to, the Medical Detachment, Telemedicine (MDT), the Warfighter Physiological Status Monitor (WPSM), and the Electronic Information Carrier (EIC).

(3) The MC4 system will implement security services to ensure the availability, integrity, and access control of the system and data and to meet the security policy requirements for accreditation by the Designated Accreditation Authority. These services will comply with DODD 5200.28, Security Requirements for Automated Information Systems (AISS), 21 March 1988, and DODI 5200.40, DOD Information Technology Security Certification and Accreditation Process (DITSCAP), 30 December 1997.

(4) An Integrated Logistics Support (ILS) approach will be used that includes, but is not limited to: supply support; technical data; facilities; manpower and personnel; packaging, handling, storage, and transportation; and training and training support.

(5) The MC4 system will consist of three basic components: software, hardware, and telecommunications systems.

(a) Software capability.

i. The Joint TMIP will provide common medical software and interoperability standards to support joint theater operations. The software will provide an integrated medical information capability that will support all levels of care in a theater of operations with links to the sustaining base. Medical capabilities provided by the software to support commanders in the theater will address: medical command and control (C2) (including medical capability assessment, sustainability analysis and medical intelligence); MEDLOG (including blood product management and medical maintenance management); casualty evacuation; and health care delivery. Information systems being considered as TMIP components include Composite Health Care System II (CHCS II), Defense Medical Logistics Standard Support (DMLSS), Defense Blood Standard System (DBSS), and Transportation Command (TRANSCOM) Regulating and Command and Control and Evacuation System (TRAC²ES),

ii. The MC4 program will develop or procure software to support Army unique medical requirements and any software needed to be interoperable with Army information systems such as CSSCS, GCSS-A, FBCB2, Warrior Programs, and the Movement Tracking System.

(b) Hardware systems. The hardware will consist of commercial off the shelf (COTS) automation equipment supporting the above software capabilities. Examples include, but are not limited to, computers, printers, networking devices, and the Electronic Information Carrier (EIC).

(c) Telecommunications systems. The MC4 system will rely on current and proposed Army solutions for tactical, operational, and strategic telecommunications systems to transmit and receive digitized medical information throughout the theater and back to the sustaining base. There will be no separate AMEDD communication system. Telecommunications at brigade and below will be accomplished through the Tactical Internet (TI); above brigade level, telecommunications will be accomplished through the WIN architecture. The MC4 system will include hardware or software required to interface with current and emerging technologies supporting manual, wired, and wireless data transmission. At end-state, the MC4 system users will exchange data electronically via the WIN architecture. In the interim, commercial satellite and/or high frequency radio will be fielded to selected medical units (i.e. Medical Detachment-

Telemedicine (MDT), etc.) to support high bandwidth requirements until the WIN architecture is fully fielded. Personnel operating satellite assets are resourced in the MDT TOE and will be located with the MDT.

g. Operational Concept by Echelon - The How, What, Where, and Who.

(1) Introduction. To facilitate a better understanding of the operational concept, the echelons of care are defined below. The same documentation will occur regardless of whether the care is given to a U.S. Army soldier, a service member from another U.S. Service, a civilian working for the U.S. government, a member of a coalition service, an enemy prisoner of war, or a local civilian.

(a) Echelon 1 (Emergency Medical Care). This echelon represents routine or emergency medical care provided by a variety of personnel. The initial treatment may be provided by self-aid/buddy aid or combat lifesaver, followed by a combat medic. The combat medic provides first aid and conveys or directs the casualty to the battalion aid station (BAS). The BAS provides essential emergency care and prepares the casualty for evacuation to the rear as required.

(b) Echelon 2 (Initial Resuscitative Care). This echelon provides routine or resuscitative care as provided by a company-sized medical unit such as a divisional or area support medical company. With EAD augmentation of the medical unit, initial surgery to save life or limb will be available. The medical units prepare those patients requiring further care for evacuation to the next echelon facility.

(c) Echelon 3 (Resuscitative Care). This echelon provides medical care in a hospital staffed and equipped for surgery and post-operative care. These facilities may provide additional surgical specialty support, and additional laboratory and radiology support.

(d) Echelon 4 (Essential). This echelon provides medical care in a facility staffed and equipped for follow-up surgery, and other rehabilitative therapy for patients in the recovery phase who may be expected to return to duty.

(e) Echelon 5 (Definitive). Care is convalescent, restorative, and rehabilitative and is normally provided by military, Department of Veterans Affairs, or civilian hospitals

in the Continental United States (CONUS). This phase may include a period of minimal care and increasing physical activity necessary to restore patients to functional health and allow their return to duty or useful life.

(2) The MC4 system is designed to support conventional Army forces. The architecture of the system assumes that the medical data generated by a medical encounter will not be classified and can be transmitted directly to the various command surgeons for their use in trend analysis, using standard Army communications systems. The specialized security and communications requirements of the Army Special Forces teams cannot be met by MC4 and preclude their use of the system at this time. This preclusion does not apply to Special Operations Support Battalions which will be equipped with the MC4 system.

(3) Soldier Level. Soldiers have long required the ability to carry medical information with them for purposes of individual readiness, continuity of care, medical surveillance, and post deployment health care follow-up. Virtually all this critical medical information is currently documented on paper, after the fact. In order to become a part of the soldier's permanent medical record, the pieces of paper must be physically transported back to the soldier's home station and then physically placed in that record. Because of weight, preparation difficulties (rain, cold, darkness), and storage limitations, it is impossible to maintain a high level of paper documentation during an operational deployment.

(a) Within the MC4 system, medical information about each soldier will be entered into a local database maintained at the supporting BAS or troop medical clinic. This information will include the soldier's immunization, medical, and dental deployability status. A commander, faced with a deployment, will be able to simply query the database to gain the deployability status of the entire command. Time previously spent on physically searching paper records will be available for other tasks.

i. In conjunction with the MC4 system each soldier will be issued an EIC. The EIC is an electronic device that will store personal information about the individual soldier. The EIC will be used to record all of the soldier's health care events and the soldier's readiness status. Each time a soldier receives medical care or immunizations the medical history on the EIC will be updated. When a soldier is deployed, his EIC will

contain baseline clinical data. During processing for deployment the medical staff will be able to read demographic, immunization, medical, dental, and medical history data directly from the EIC, greatly speeding up the Soldier Readiness Process. Once in an operational theater, the soldier's EIC will continue to provide a backup record of all medical events that occur during the deployment. Any medical data generated by a medical event will be entered onto the EIC as well as being entered into the MC4 information system. The preservation of medical data will no longer rely on the safeguarding and transporting of stacks of paper records. The DoD Common Access Card (CAC) may serve as the EIC. The MC4 system will be capable of reading and writing to the CAC.

ii. As part of the Warrior program (Land Warrior, Mounted Warrior, etc.), under Program Manager (PM) Soldier, the WPSM is under concept development. The WPSM will be a suite of external sensors that will monitor a soldier's vital signs. These sensors will feed the vital sign information to a body-worn computer (also part of the Warrior system). An artificial intelligence program will process the vital sign information and generate an alert if the vital signs fall outside of pre-set ranges. The Warrior system will also provide a medic alert button that the soldier can press if he requires medical assistance. The alert will transmit a distress call to the platoon leader/platoon sergeant and medic. When either alert is activated, the vital sign information coming from the WPSM will automatically be broadcasted to the medic as well as recorded onto the EIC. The WPSM and Warfighter Ensemble are currently being designed for combat troops but a Combat Service Support model has been proposed.

(b) Databases. Within the MC4 system, medical information on soldiers will be stored at multiple sites. This will allow commanders and command surgeons at the various echelons to access medical information about soldiers at the same or lower echelons to find out specific information, and to conduct analysis of disease/injury trends. Local databases (LDB) also provide information redundancy should destruction of an information node or communications outage occur. Each database will transmit update information to the databases in the next higher echelon above it as well as to the Interim Theater Database (ITDB). Personnel (medical commanders, staff surgeons) at each echelon will be able to query the database at that echelon. The ITDB will provide a data repository for all medical data generated within a theater of operations. It will be the

connecting point for the medical information system of each Service and of coalition forces. The ITDB will consist of two databases; the Interim Theater Database - On-Line Transaction Processor (ITDB-OLTP) and the Interim Theater Database - Operational Data Store (ITDB-ODS). The ITDB-OLTP is structured to efficiently receive and store data from lower echelons. The ITDB-OLTP will then copy its data to the ITDB-ODS, which is structured to more efficiently process queries to the database. Combined, these two databases form a data repository, located at the CINC level, that will store all medical data from the theater and allow the CINC Surgeon to query the data to retrieve specific data elements or to test for medical trends and threats. The CHS information required by CSSCS will pass from the MC4 system either directly to CSSCS or through GCSS-A. The types, locations, and connectivity of the various databases to be located in theater are depicted in figure 1.

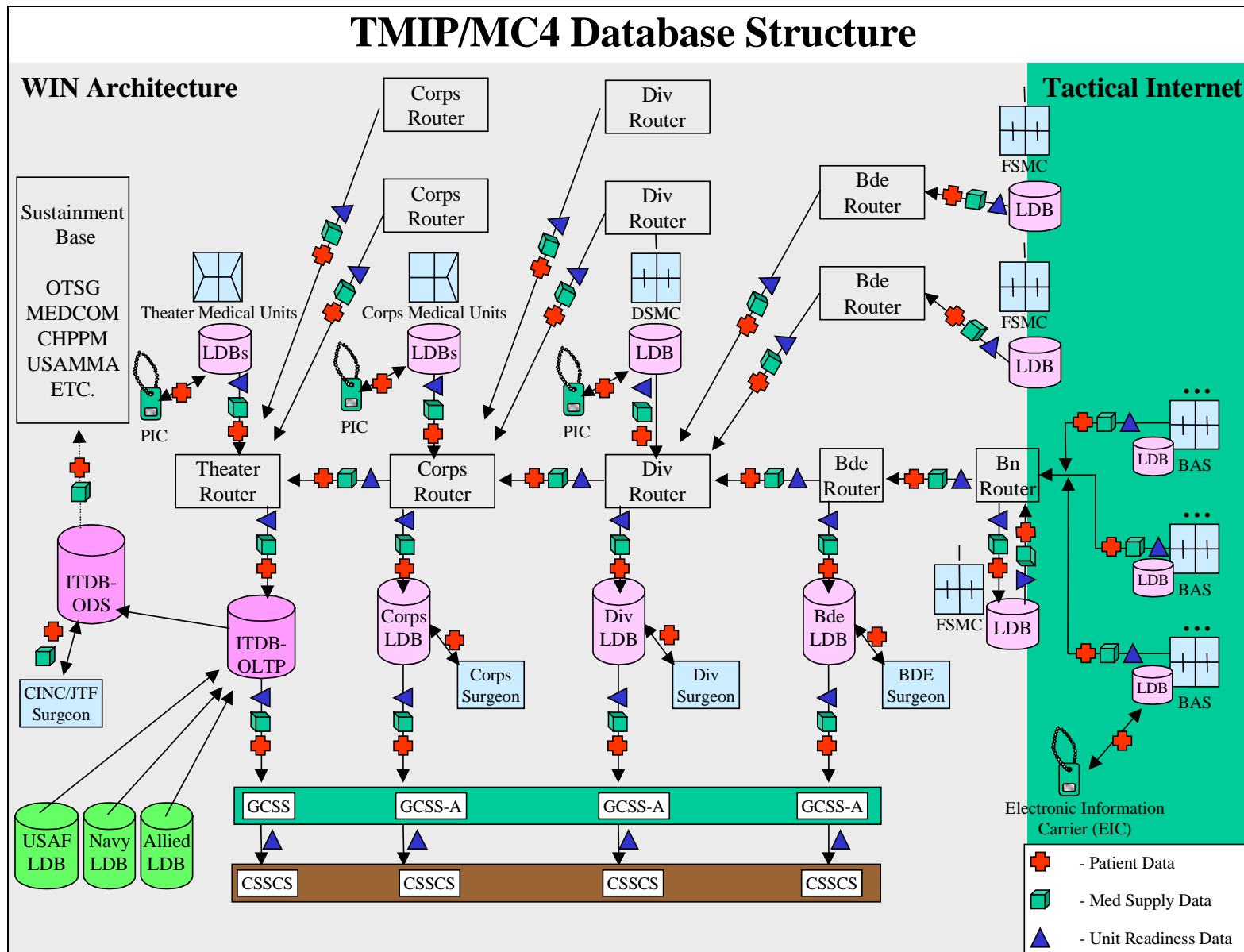
i. Personal Information Carrier. The EIC will contain the medical information relevant to one soldier. An EIC will be provided to every individual in the theater, military, contractor or DOD civilian. Medical facilities at all echelons will have the capability to generate an EIC as new personnel are assigned or EICs are misplaced.

ii. Battalion Aid Station/ Forward Support Medical Company (FSMC)/ Division Support Medical Company (DSMC)/ TMC/Area Support Medical Battalion (ASMB)/Combat Support Hospital (CSH). Units responsible for the treatment of soldiers will maintain a database containing medical information relevant to the soldiers that it supports, as well as any other medical encounter it processes.

iii. Battalion/Brigade/Division /Corps/Theater (Army) Surgeon. Surgeons will maintain a database containing medical information relevant to the soldiers in that command.

iv. CINC/JTF Surgeon. The CINC/JTF Surgeon will maintain a database containing all medical information relevant to the entire theater. This will be the ITDB which provides information to update sustaining base medical information systems such as the computer based patient record and health surveillance system.

Figure 1. The MC4/TMIP System Database Structure



(c) Combat Medic. The combat medic will be the first point where a casualty interfaces with the MC4 system. Each medic will be equipped with a computer capable of reading and writing to the casualty's EIC. The EIC will store any medical care provided by the medic to the casualty. Where communication assets allow, this information will also be transmitted to the supporting BAS. Medics assigned to maneuver battalions equipped with the Land Warrior system will have some additional capabilities. A Warrior Medic version of the Warrior Ensemble is being developed with specific medical requirements. The Medic Warrior Ensemble will include a body-worn computer, a global positioning system (GPS) locator, and a Warrior system radio. When a soldier's WPSM/computer system broadcasts an alert or a soldier activates his medic call button, the medic will receive these alerts and the flow of vital sign information over his Warrior system radio. The GPS locator will allow the medic to quickly locate and reach the casualty. The medic's computer will be able to read vital signs directly from the casualty's WPSM. All of these capabilities will enhance the medic's ability to quickly detect, reach, and treat a casualty. In the event of multiple casualties, the flow of WPSM data to the medic will allow him to prioritize the casualties, using remote triage, in order to reach the worst injured first. This Warrior Medic capability will be procured through PM Soldier but will be closely coordinated with PM MC4 to ensure integration and compatibility of data and transmission methods.

(d) Evacuation. When a casualty's injuries or illness require treatment beyond the combat medic's abilities, the casualty will be evacuated to a higher level of medical care, most often the BAS. Evacuation will be accomplished via dedicated medical evacuation vehicles, wheeled or tracked ambulances or helicopters. During evacuation, the casualty will be monitored by on-board medics who will apply enroute treatment as required. Digital on-board medical equipment will eliminate the difficulties inherent with manual vital signs monitoring. Each evacuation vehicle will be equipped with an onboard MC4 system, which will interface with the casualty's EIC. Enroute care received will be recorded on the EIC and could also be transmitted to the destination medical treatment facility. Digital linkages to medical C2 units/medical regulators will allow for redirecting the casualty, enroute, should the need arise. The request for medical evacuation (MEDEVAC) from the medic's site will be made over FBCB2 utilizing a built-in MEDEVAC request.

(e) Battalion Aid Station. At the BAS the casualty may receive emergency resuscitative care. The medical staff will use the MC4 system computers to read the casualty's EIC, learning what medical care the casualty has already received and any relevant medical history. This information, along with any information generated by the treatment that the casualty receives at the BAS will be recorded onto the local database. The information will also be transmitted to the next higher level of medical care (the FSMC), and ultimately to the ITDB.

(f) Medical Logistics. The present MEDLOG system at Echelon I is a totally manual system. In the future, the combat medic will utilize FBCB2 to request medical supplies from the BAS. This request will be a built-in report on the FBCB2 system. At the BAS, requests for medical supplies will be made utilizing the MC4 system. This automation will not only speed the resupply process, but will also allow the combat commander to maintain visibility of his unit's MEDLOG status, either through FBCB2 or through MC4's link to CSSCS through GCSS-A.

(4) Echelon II.

(a) At the Echelon II medical units (FSMC, DSMC) the MC4 system will provide the same augmentations to treatment documentation, evacuation, and medical logistics that were presented in Echelon I above. Medical encounter information will still be stored on the EIC to ensure up to date status is maintained should the patient return to duty. Through the use of the MDT, Echelon II medical companies will have the ability to digitize medical data (x-rays, pictures, etc.) and transmit it to medical experts at EAD. This teleconsultation ability may result in casualties being treated farther forward in the theater and will increase the return to duty rate and reduce over-evacuation.

(b) The Medical Material Management Branch (MMMB) at the Division Materiel Management Center will be the Class VIII commodity manager. Using the same automated tools as the other commodity managers, the MMMB will make arrangements to fill the request through the battlefield distribution system. The MC4 system, through its interface with GCSS-A, will automate linkage of Class VIII to the transportation system. The management of the complex medical sets and Class VIII material will be automated, which will improve efficiency over the current manual system. The use of the joint TMIP software design will sustain the Army's Class VIII support to other Services.

(c) The Echelon II combat stress control, dental, and preventive medicine sections will be equipped with personally carried or mobile computers.

(5) Echelons III and IV. These echelons contain hospitals and all of the specialized medical units required to support the theater. The MC4 system will link all of their medical functions. The MC4 Product Manager will equip corps treatment and evacuation teams with personally carried and mobile MC4 systems for the collection and forwarding of medical information to the forward, division, or area support medical companies. Likewise, combat stress control teams, veterinary teams, dental teams, and preventive medicine teams operating in the brigade rear area will be equipped with personally carried or mobile computers. Corps/theater medical regulators/medical C2 elements will be able to rapidly and accurately match treatment capability with an evacuating casualty's need for care, prior to evacuation. The MC4 system will utilize TRAC²ES to provide this functionality. A seamless Class VIII (including blood) automated system will link the theater to prime vendor systems in CONUS.

(6) Command and control. At all echelons, the MC4 system will automatically provide information such as evacuation status, current fitness for combat, immunization status, and hazard exposure information to the commander's situational awareness system. The MC4 system will provide the commander with the ability to track and record the date and location of exposure to health hazards, which include environmental, occupational, industrial, nuclear, biological, and chemical (NBC) hazards. This information is critical to the force protection health hazard analysis necessary to identify emerging disease and non-battle injury (DNBI) problems and trends. Commanders will have near real time information on: food source safety/quality, operationally significant zoonotic disease, health surveillance/trends, and health hazard assessment data for NBC/endemic disease threats and occupational or environmental health threats. Information will be provided to the commander from the MC4 systems, through GCSS-A, to CSSCS. Commanders, for the first time, will have a medically complete picture of the battlefield, which will allow them to accurately influence current operations while synchronizing CHS with other activities.

(7) Echelon V. All care/exposure information collected in the Theater will be digitally stored and available for analysis. The documentation of immunizations, for example, will eliminate

challenges that have surfaced post deployment, for vaccines such as anthrax and botulism. This information will be stored not only in the Echelon I database supporting the soldier, but will be transmitted to the ITDB and the soldier's permanent computerized record. The digital documentation of medical treatment/exposure information will make addressing health exposure issues, as seen in the Gulf War and more recent deployments, much easier.

h. Command Capabilities - The Why. The MC4 system requirements are designed to provide the Warfighter with the CHS digital tools necessary to operate on the broad spectrum Force XXI battlefield and Army, 2010 and beyond by enhancing their ability to: project the force, protect the force, sustain the force, and gain information dominance. Enhancements in these areas contribute to the ability for commanders to shape the battle space and conduct decisive operations.

(1) Project the Force.

(a) Commanders will have, for the first time, readiness tracking and reporting during all phases of deployment. The MC4 system will enhance the ability of commanders to track/report qualification for worldwide deployment by tracking such items as dental readiness, immunization status, flight status, physical profile, eyeglass prescriptions, current medical condition and medications, thereby ensuring that the commander deploys a fit and healthy force. These digital tools will significantly enhance theater clearance and manifesting which will ultimately streamline the Soldier Readiness Process.

(b) Fielding of modular/tailorable CHS units, combined with the MC4 System, will allow optimization of the CHS footprint within a theater of operations, minimizing strategic lift and ensuring early deployment of critical CHS assets. The IS and "reach back" capability will also optimize theater assets. Teleconsultation will provide specialty medical information to maximize the effectiveness of deployed personnel.

(2) Protect the Force.

(a) The EIC and local databases, combined with the near real time ability to monitor and record soldier physiological parameters (combat fitness) and hazardous exposure data (environmental, industrial, and NBC), will provide a complete picture of the medical status of an individual soldier and

unit's medical fitness. Trends could be immediately analyzed and commanders could take immediate action to reduce DNBI.

(b) The MC4 system will optimize the synergy of veterinary personnel, preventive medicine personnel, combat stress control (CSC), and laboratory personnel by providing trends for analysis along with test results for immediate evaluation. This will expedite command intervention. The MC4 system capability also will help prevent the problems seen during recent deployments with incomplete environmental exposure information and immunization information post-deployment. veterinary personnel, who are the DOD executive agent for related services, will have immediate access to food inspection information. Contracting officers will be able to access listings of approved food procurement sources and the Biological Integrated Detection System will be able to link with the Area Medical Lab for immediate testing results.

(3) Sustain the Force.

(a) The MC4 system, through GCSS-A to CSSCS, will provide commanders with information on combat health support requirements from supported units, the current location of medical assets and their operational capability, along with Class VIII supply status for items that have been designated as critical in CSSCS. The information available will enhance the ability to conduct Class VIII resupply using throughput distribution and the battlefield distribution system, while minimizing the medical footprint. Automated MEDLOG capability will eliminate the DMSO and its Class VIII stockpile. Division stockage of Class VIII will be reduced from 10 DOS (66 short tons) to 5 DOS (33 short tons). Corps Class VIII stocks will be reduced from 20 DOS (1920 short tons) to 10 DOS (960 short tons). The EAC Class VIII stockage will be reduced from 30 DOS (2880 short tons) to 15 DOS (1440 short tons). In an operational theater, Class VIII stocks are expected to be reduced by 50%. The manual inventory management of divisional medical sets, consisting of hundreds of Class VIII lines, will be automated, resulting in significant savings in man-hours. This MEDLOG capability will reduce man-hours, and improve quality control of drugs and pharmaceuticals, which will ultimately improve medical care. The standardization of CHS business practices DOD wide, to include MEDLOG, will enhance the Army commander's ability to act as the DOD executive agent for MEDLOG support.

(b) Command visibility of CHS operations, along with other CSS operations and tactical operations, will provide commanders with the ability to synchronize and optimize the use of support assets in support of the warfighter.

(c) The MC4 system capability to have digital images interpreted by sustaining base personnel or conduct teleconsultation will enhance support to soldiers by bringing digitized specialty medical skill support to the battlefield.

(d) Two of the most significant capabilities that the MC4 system will bring the warfighter are enhanced ability to clear the battlefield and in-transit visibility of casualties. Historically, the KIA rate has remained stubbornly at between 1% - 3% of those wounded in combat. Of those who die in combat, 30% of them have the potential to survive with prompt resuscitation. Prompt treatment reduces morbidity as well as mortality. The MC4 system, in combination with the Warrior program, will provide the immediate identification and location of a casualty, as well as the extent of injury or disease. Location information will allow commander to weigh the tactical risk of immediate medical intervention (to include combat lifesaver) and will enhance medical response time. Digital evacuation requests will move fast and without error through the tactical internet and WIN allowing for a faster response by MEDEVAC personnel.

(e) Once in the evacuation system, commanders, medical personnel, and the personnel system will have in-transit visibility and accountability of evacuees. Many accountability problems were reported during Desert Storm. In-transit visibility and accountability capability will allow the matching of soldier treatment requirements with the forward medical facility capability, which will minimize over-evacuation. Forward medical treatment will increase the return to duty rates by keeping soldiers as far forward as possible on the battlefield. Enroute care and soldier health status will also be monitored, reported, and transmitted while in-transit, improving the over-all care/survivability of the soldier.

(4) Gain Information Dominance. The MC4 system will provide commanders with automated CHS information through interface/integration with the Army standard situational awareness systems (FBCB2, CSSCS, and ultimately GCCS-A). This complete, common CSS/operational picture will improve the Commander's ability to make informed decisions concerning the influencing of on-going operations. Commanders will know the

current fitness for combat of soldiers/units and complete CHS readiness. This complete situational awareness will enhance the commander's mental agility and improve decisions concerning the changing of supply priorities and rapid shifting of other resources. Ultimately, the Commander will be able to synchronize and maximize CHS operations with other CSS and tactical operations.

i. Support Concept.

(1) Hardware. Hardware infrastructure will be supported by the Tri-Service Infrastructure Management Program Office for fixed medical facilities. The MC4 hardware for deployable medical organizations will be supported by the existing Army logistics system and maintained by standard tools and test, measurement, and diagnostic equipment (TMDE) as applicable.

(2) Software. TMIP provided software will be supported by the Tri-Service Medical System Support Center. The MC4 system unique software will be supported by the Army logistics system.

(3) Telecommunications. Telecommunications equipment for deployable medical units provided as Government Furnished Equipment (GFE) will be supported by the existing Army logistics systems. Commercial systems procured as an interim solution (such as the MDT) must include a vendor maintenance contract.

j. Future Operational Capabilities (FOCs). A requirement for the MC4 system supports the following approved TRADOC FOCs.

(1) MD 97-001. Patient Evacuation

(2) MD 97-002. Medical Command, Control, Communication, Computers, and Intelligence (MC4I)

(3) MD 97-003. Patient Treatment and Area Support

(4) MD 97-004. Combat Health Support in a NBC Environment

(5) MD 97-005. Far-Forward Surgical Support

(6) MD 97-006. Hospitalization

(7) MD 97-007. Preventive Medicine

(8) MD 97-008. Combat Health Logistics System (CHLS) and Blood Management

(9) MD 97-009. Combat Stress Control (CSC)

- (10) MD 97-010. Medical Laboratory Support
- (11) MD 97-011. Dental Service
- (12) MD 97-012. Veterinary Services: Capability to Provide Veterinary Support for Force XXI.
- (13) MD 97-013. Mobility/Deployability

k. C4ISR (Information Exchange) Operational Concept

(1) As an integrated medical information system, MC4 will utilize the existing and future Army communication systems to transmit medical data from one MC4 node to another. In specific instances where the standard Army communications network cannot support the medical data transmission requirements, medical data will be transmitted via AMEDD-provided communications assets in the form of the MDT.

(2) In addition to data transmission between MC4 nodes, MC4 will also pass selected medical data to standard Army CSS and C2 systems such as GCSS-A and CSSCS. This will be in the form of unit data that will provide the CSS and combat commanders with medical situational awareness and medical unit statuses. Additionally, these interfaces will link MC4 with the other CSS STAMMIS, allowing the medical community and the other CSS communities to share required information in a seamless manner. (See Figure 2 - OV-1)

1. Acquisition Strategy: Because the MC4 hardware infrastructure is largely designed to carry the Joint TMIP software, its acquisition strategy will be closely tied to the development schedule of TMIP. TMIP will utilize an evolutionary acquisition development strategy that will add new functionality in an incremental manner. As TMIP's capabilities are developed, they will be deployed with the required MC4 infrastructure. MC4 will utilize commercial off the shelf (COTS) hardware. As new TMIP blocks present new hardware requirements, MC4 will field "state of the shelf" equipment.

2. Threat.

a. Threat to be countered. The MC4 system will support a health care delivery mission and is not intended to overcome or present any significant threat implications.

b. Projected threat environment.

(1) The U.S. military forces must be prepared to deploy worldwide and, if necessary, defeat threat forces of varying degrees of military sophistication at any level of conflict. In the post-cold war environment split-base operations will be the norm. Large amounts of information supporting MC4 will reside in CONUS and on the battlefield. This information will be transmitted across the Army's strategic, operational, and tactical information architecture. The greatest dangers will be the proliferation of advanced technologies, computer network attack technologies, weapons of mass destruction, and high-altitude electromagnetic pulse (HEMP) events that have the ability to damage, disrupt, or destroy the MC4 system, as well as the information residing in the system.

(2) An adversary can threaten MC4 in four fundamental ways:

(a) Compromise of data by gaining access to confidential or sensitive medical information stored within medical information systems.

(b) Corruption of data by the alteration of electronically stored or processed information so it becomes misleading, worthless, or inappropriate.

(c) Disruption of medical operations by inflicting damage or causing delays (physically or electronically).

(d) Detection/interception of signals from such as the WPSM and personally carried computer transmissions which could be used for detection, and compromise a soldier's position.

(3) More specifically, these threats include: Internet protocol (IP) spoofing, jamming, electronic warfare, information warfare, computer network attack, signals intelligence, technical attack, directed energy, malicious code, computer viruses, threat to cable communications, remote insertion of false data, physical destruction, unconventional warfare, HEMP, direct signal attack, indirect signal attack and unauthorized

access. The most likely threat will come from attacks directed against the MC4 system and the data it contains. The NBC warfare operations may render the system temporarily unusable or may destroy it.

(4) Individually, or collectively, these threats can distort the picture of the battlefield and affect tempo, lethality, survivability, and medical health services orchestration. They also can allow an adversary indication of the deployment of forces, sites of interest, or areas that either have suffered casualties or are preparing to do so, which all impact not only on medical mission performance, but on combat mission performance as well.

(5) Threats to the MC4 system are similar to those encountered by the Land Warrior system. These threats are described in Defense Intelligence Reference Document, NGIC-1149-0469-00, Future Threat to the Soldier System (U), December 1999, (S//NF//X1). Foreign computer network operations threats to DoD logistic information networks dependent on Internet are addressed in the Foreign Computer Network Operations Threat to US Military Logistics Networks (U), DI-12710-29-0, April 2001 (S//NF//X1). WC4-AIS threats are addressed in the Automated Information Systems Threat Environment Description (TED) (U), NAIC-1574-0210-00, September 2000 (S//NF//MR) and Electronic Warfare Threat Environment Description (TED) (U), NAIC-1574-0731-01, February 2001 (S//NF).

3. Shortcomings of Existing Systems and C4ISR Architectures.

a. There is no existing automated information system to integrate and report critical medical information in support of the warfighting commander. Existing medical information systems are focused mainly on vertical information flow within a stovepipe structure in fixed medical facilities. Commanders do not have access to critical medical information that could assist them in planning operations and making decisions regarding shaping the battle space and sustaining the force. An automated medical information system is required to link, both horizontally and vertically, the health care provider with diagnostic systems, automated treatment capabilities, evacuation platforms, other health care providers, and warfighter C2 in order to clear the battlefield and report complete situational awareness for the commander. Health care personnel at all echelons must be able to communicate with each other by audio, video, and electronic media to provide the commander with

required medical information.

b. Specific shortcomings include, but are not limited to the following.

(1) There are inadequate automated medical C4I systems to support warfighter planning and decision making.

(2) The CHS systems are manual at brigade, battalion, and company level. Manual information systems do not interface with emerging warfighter digital systems. Manual systems cannot support Force XXI command requirements for timely CHS information. Without timely CHS information, commanders cannot influence operations. The shortfalls and inadequacies (particularly in information exchange capabilities) of current manual information systems are exacerbated in combat and Stability and Support Operations (SASO) environments which increasingly require rapid and frequent mobility. Manual record keeping systems do not comply with Presidential and Congressional directives for soldier monitoring and health documentation.

(3) There is no interoperability between existing medical systems to enhance timely, efficient medical treatment.

(4) There are no deployable automated clinical information systems to support the warfighting commander through the entire spectrum of split-base military operations.

(5) There is no patient movement tracking system in the theater to provide the commander information about the location and status of his soldiers who have become casualties.

(6) There are no automated systems to document intra-theater immunizations, treatment, and health hazard exposures. This information is important in providing the commander with information regarding the medical readiness of his unit.

(7) There is no automated medical logistics information systems at corps and below to expedite the resupply of medical supplies to forward areas and decrease the medical logistics footprint on the battlefield by eliminating stockpiles of medical supplies.

4. *Capabilities Required.

a. The MC4 system has the following missions:

(1) Provide the Army computer infrastructure to enable automated medical data collection and sharing throughout the continuum of medical care (from the point of injury to the sustaining base).

(2) Provide the computer infrastructure for the Army's implementation of the Joint TMIP software. As needed, develop software for Army-unique medical requirements not met by TMIP.

(3) Provide commanders, at all levels, with timely medical situational awareness and unit status information.

(4) Provide medical units with the ability to capture and transmit high-density medical data to higher echelons of medical care. This is an interim requirement until future improvements in the Army communications infrastructure, capable of handling this type of high-density data, are adequately fielded.

b. Performance Parameters by Mission

(1) Mission: Medical computer infrastructure.

(a) Performance parameter 1*:

i. Criteria: The MC4 system must be deployable and capable of being task force tailored to support a wide range of contingency operations to include split-base operations. The MC4 system will be transportable by air, ground, rail, and water. The total system, including telecommunications, set-up, tear-down, configuration and reconfiguration will be accomplished by unit personnel and must not impair continuity of operations or mobility. Threshold: The use of MC4 will not lengthen the normal set-up or tear-down time of any divisional medical unit. Objective: Same as threshold.

ii. Rationale: Force XXI is modular to support a capabilities-based design. Army units will be packaged for contingency operations based on the mission. Modularity allows the division a means to provide force elements that are interchangeable, expandable, and tailorable to meet the changing

* Indicates Key Performance Parameter (KPP)

needs of the Army. The MC4 system must support this modular concept. Rapid strategic deployment and tactical mobility are critical to effective wartime operations. The MC4 system components will be required to deploy to locations and situations across the operational continuum. The use of MC4 must not add to divisional medical unit set up and tear-down times, based on approved Mission Training Plans (MTPs), and the use of MC4 must not require any additional unit personnel. Having this flexibility ensures that the MC4 system will be deployed when and where needed to support the warfighter.

(b) Performance parameter 2:

i. Criteria: The MC4 system must be mission capable in mobile and static scenarios as defined in the Operational Mode Summary/Mission Profile (OMS/MP) for MC4. Threshold: It must be mission capable 83 percent of the time in a mobile scenario and 95 percent of the time in a static scenario. Objective: It must be mission capable 95% of the time in a mobile scenario and 97% of the time in a static scenario.

ii. Rationale: The MC4 system must perform the same functions in both mobile and static environments. In the mobile scenario where user sites may be required to relocate daily, the MC4 system mission capability must not fall below 83 percent in order to maintain adequate medical information as a component of the overall CSS situational picture for the commander and his staff. The MC4 system reliability and maintainability (R&M) characteristics must be comparable to and consistent with those of existing Army information management systems or COTS systems. The materiel developer, through the market investigation process, will determine the benchmarks for these items and will ensure the Army procures only items that are consistent with those R&M benchmarks.

(c) Performance parameter 3:

i. Criteria: The MC4 system must provide Army battalion, brigade, division, corps, and theater level commanders and their surgeons the ability to quickly query a medical database containing medical data relevant to their command. Threshold: Query time for a single data element search should take less than three minute once communication connection has been established with the host database. Objective: Query time for a single data element search should take less than one minute once communication connection has been established with the host database.

ii. Rationale: The capability to access the MC4 system databases to query data concerning soldier/unit medical readiness, enhances a commander's decision making about the deployability or health status of his unit or a particular soldier. Providing more accurate and timely information will decrease decision making time for commanders and their staffs. For example, if a commander knows that a particular soldier is medically unfit for deployment, he can requisition a replacement. If a commander understands that 40% of his unit is sick and will not return to duty for 48 hours, he will be better able to plan for military operations.

(d) Performance parameter 4:

i. Criteria: The MC4 system must provide an alternate method of transferring medical data from one MC4 computer to another when telecommunications are interrupted or are not available. Threshold: Any MC4 computer must be equipped with some form of removable media sufficient for holding all medical data contained on that computer until such times as it can be uploaded to another MC4 computer. Objective: Same as threshold.

ii. Rationale: Health care providers must have access to medical information to facilitate the proper diagnosis, treatment, and/or evacuation of a patient. Commanders must also have access to medical information as part of their situational awareness and decision making process. The loss or non-availability of normal telecommunications must not prevent the transfer of medical data from one medical echelon to another. The transfer of medical data via removable media, such as a floppy disk or tape, would allow health care providers and commanders to continue their operations, albeit in a degraded mode.

(e) Performance parameter 5:

i. Criteria: The MC4 system must process data and perform calculations with a high degree of accuracy. Threshold: Properly entered medical data will be processed with 99.99% accuracy. Objective: Properly entered medical data will be processed with 99.999% accuracy.

ii. Rationale: Users need the assurance that once

valid data is entered properly, it will remain unchanged when processed correctly. Processed data that is suspect can result in mission delays and can interfere with the need to provide time-sensitive information required in making crucial decisions. A high degree of accuracy of mathematical calculations and algorithmic computations is absolutely critical for commanders who rely on this data for life or death alternatives on the battlefield. The threshold and objective parameters conform to the IDM CRD.

(f) Performance parameter 6:

i. Criteria: The use of the MC4 system must not increase the amount of time required to record and process medical data over that required to perform the same tasks manually. Threshold: Performing medical data processing tasks will require no more time when performed on an MC4 computer than when performed manually. Objective: Performing medical data processing tasks will require half as much time when performed on an MC4 computer as when performed manually.

ii. Rationale: During high demand periods, where speed and accuracy are paramount, the ability of the health care provider to adequately record medical data will be challenged. If the MC4 system does not capture this data at least as fast as a manual system, then it will be of limited value and is unlikely to be utilized.

(2) Mission: Provide the computer infrastructure for the Army's implementation of the Joint TMIP software. As needed, develop software for Army-unique medical requirements.

(a) Performance parameter 1*:

i. Criteria: The MC4 system must be compliant with Defense Information Infrastructure Common Operating Environment (DII COE)(minimum level 6), Joint Technical Architecture (JTA)/Joint Technical Architecture (JTA)- Army, Army Training XXI Technical Architecture, Common Training Instrumentation Architecture, and Health Industry Business Communication Council standards. The MC4 system COTS hardware and software must be Year 2000 (Y2K) compliant and must conform to joint Command, Control, Communications, Computers, and Intelligence Surveillance and Reconnaissance policy and doctrine. The MC4 computer hardware must be able to run the operating system utilized by TMIP. Threshold: The MC4 system infrastructure will be able to operate the TMIP software. Objective: The MC4 system

infrastructure will be able to operate the TMIP software and any Army unique software developed by the MC4 program will be fully compatible with the TMIP software. Where applicable, medical software developed by MC4 will use data elements from the Defense Data Dictionary System (DDDS). It will also be developed to be in compliance with the provisions of the IDM CRD. Software developed by MC4 must be tagged in accordance with JTA standards and in compliance with the Defense Information Systems Agency (DISA) registry.

ii. Rationale: The Jointly developed TMIP software will provide the majority of the medical functionality for the MC4 system. It will provide the ability to smoothly link the Army medical capabilities in a Theater of Operations with those of the other Services. In order to maintain this linkage, the MC4 computer infrastructure must be compatible with the TMIP software. Any Army unique medical software developed by the MC4 program must be capable of running on the same operating systems as the TMIP software. It must also meet the same software standards (including DII COE compliance) as the TMIP software. At a minimum the MC4 developed software will be Level 6 DII COE compliant as required by required by ASD/C3I. Additionally, compliance with the required DOD and Army information systems standards and architecture as well as the DDDS will insure that any MC4 developed software will be interoperable with Army C2 and logistics systems. Developing the MC4 system to conform with JTA/JTA - Army, DII COE specification, and DOD Human Computer Interface Style Guide will ensure technical design flexibility such that system integration, interfaces, and interoperability requirements can be achieved in an open system environment.

(b) Performance parameter 2:

i. Criteria: The MC4 system must provide deployable medical elements with a medical information system usable both in garrison and field environments, thus easing the transition from peace time to war or contingency operations. Any medical software developed by the MC4 program must be interoperable both with the TMIP software that will be used in the field environment and with TDA medical software that will be used in the garrison environment. Threshold: MC4 developed software must be interoperable with all TMIP software. Objective: MC4 developed software must be interoperable with all TMIP software and with TDA medical software.

ii. Rationale: The use of common hardware and software in garrison and in the field will facilitate transition to war. In a field environment the primary medical software will be TMIP. TMIP software is designed so that it will be compatible with the TDA medical software that will be used in fixed facility hospitals. Any medical software developed by MC4 must also be compatible with the TDA medical software.

(3) Mission: Provide commanders, at all levels, with timely medical situational awareness and unit status information.

(a) Performance parameter*:

i. Criteria: The MC4 system must be interoperable with the WIN and Tactical Internet. It must be interoperable with the ABCS subsystems GCCS-Army, FBCB2, and CSSCS. The MC4 system must also be interoperable with the TMIP. Threshold: Meet 100% of the Critical Top Level Information Exchange Requirements (IERs) listed in Annex G (Top Level IERs). Objective: Meet 100% of the Top Level IERs listed in Annex G (Top Level IERs).

ii. Rationale: A primary and substantial benefit of the MC4 system is the contribution to the ABCS information system through interoperability with CSSCS and GCCS-Army. The MC4 system will complete the CSS picture with medical C2 and management data and information. Failure to achieve interoperability will degrade the total common operating picture. The tactical commander will not have near-real time information regarding health hazards to his soldiers, location of his casualties, the medical fitness of his command. This could affect a decision to execute a planned operation. Interoperability with TMIP is essential as the Joint TMIP software will provide the common medical functionality between which will allow coordination between the medical elements of the various Services.

(4) Mission: Provide medical units with the ability to capture, transmit, and receive high-density medical data.

(a) Performance parameter:

i. Criteria: The MC4 system must use commercial, strategic, and tactical communications systems when available. Communication capabilities developed by the MC4 program must comply with the applicable DOD, national, and international spectrum management policies, and regulations. The MC4 system

telecommunications must incorporate bandwidth conservation measures and methods. Threshold: Obtain spectrum certification in accordance with DOD Directive 4650.1. Objective: Same as the threshold.

ii. Rationale: In compliance with the ABCS requirements, the MC4 system must provide an integrated, seamless medical information system. At end state, MC4 will rely on normal Army telecommunications systems. However, in the early stages of the MC4 fielding the existing Army telecommunications systems will not be capable of transmitting some of the high density medical data produced by MC4. This data consists primarily of digital images, digital x-rays, and video files. With the concurrence of the Army Signal Center, MC4 will field augmentations to the normal Army communications infrastructure as temporary measures to carry this high density medical data. In addition, MC4 will field medical local area networks (LANS) as part of some medical units. These LANS, as well as the communications augmentations must be fully interoperable with standard DOD C4I systems, architectures, and protocols. As part of this process they will require DoD spectrum certification.

c. Key Performance Parameters: The Key Performance Parameters (KPPs) for the MC4 system are shown below in Table 2.

Table 2: MC4 Key Performance Parameters

Key Performance Parameter	Threshold and Objective
Mobility	Threshold: The use of MC4 will not lengthen the normal set-up or tear-down time of any divisional medical unit. Objective: Same as threshold.
TMIP Software	Threshold: MC4 will be able to operate the TMIP software. Objective: MC4 will be able to operate the TMIP software and any software developed by the MC4 program will be fully compatible with the TMIP software.
Interoperability	Threshold: Meet 100% of the Critical Top Level Information Exchange Requirements (IERS) listed in Annex G (Top Level IERS). Objective: Meet 100% of the Top Level IERS listed in Annex G (Top Level IERS).

d. Information Exchange Requirements.

(1) The MC4 system will exchange information between MC4 nodes and with other Army C2 and CSS systems. The top-level operational concept and interface descriptions are shown in Figures 2 and 3. The high-level information exchange requirements are listed in Annex G.

(2) The MC4 system will exchange data between MC4 nodes. Additionally, MC4 will pass medical situational awareness and unit status data to CSSCS and GCSS-A. The interface with CSSCS will initially be direct but will ultimately be replaced by an interface with GCSS-A. When the GCSS-A matures, it will pass medical data from MC4 to CSSCS as well as to other C2 and CSS systems as needed.

(3) The FBCB2 system will carry some medical data. In the near term this data will not pass between FBCB2 and MC4 but an interface between the two systems may be possible in the future.

Figure 2: Medical Communications for Combat Casualty Care (MC4) ORD Top-level Operational Concept View (OV-1)

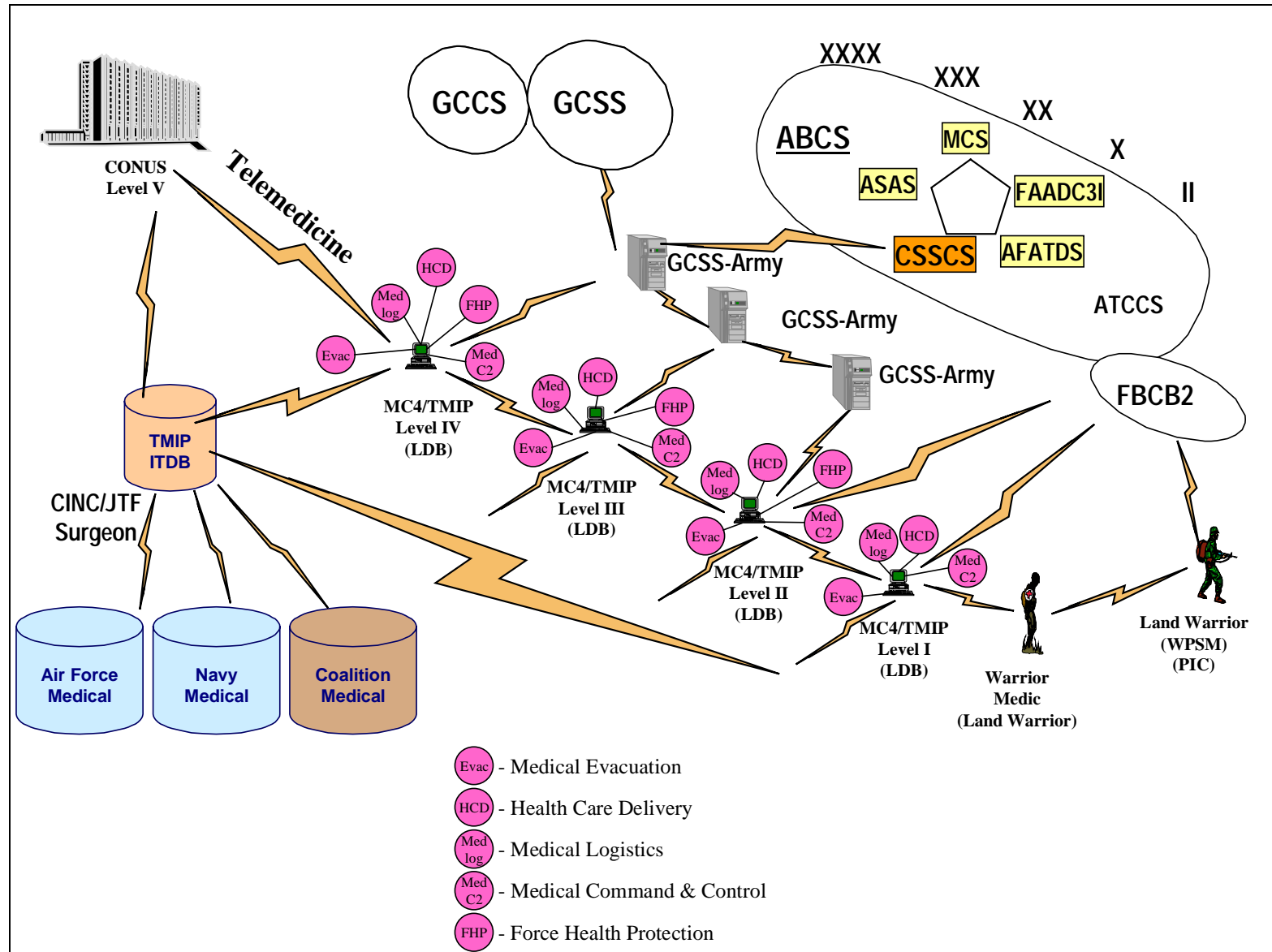
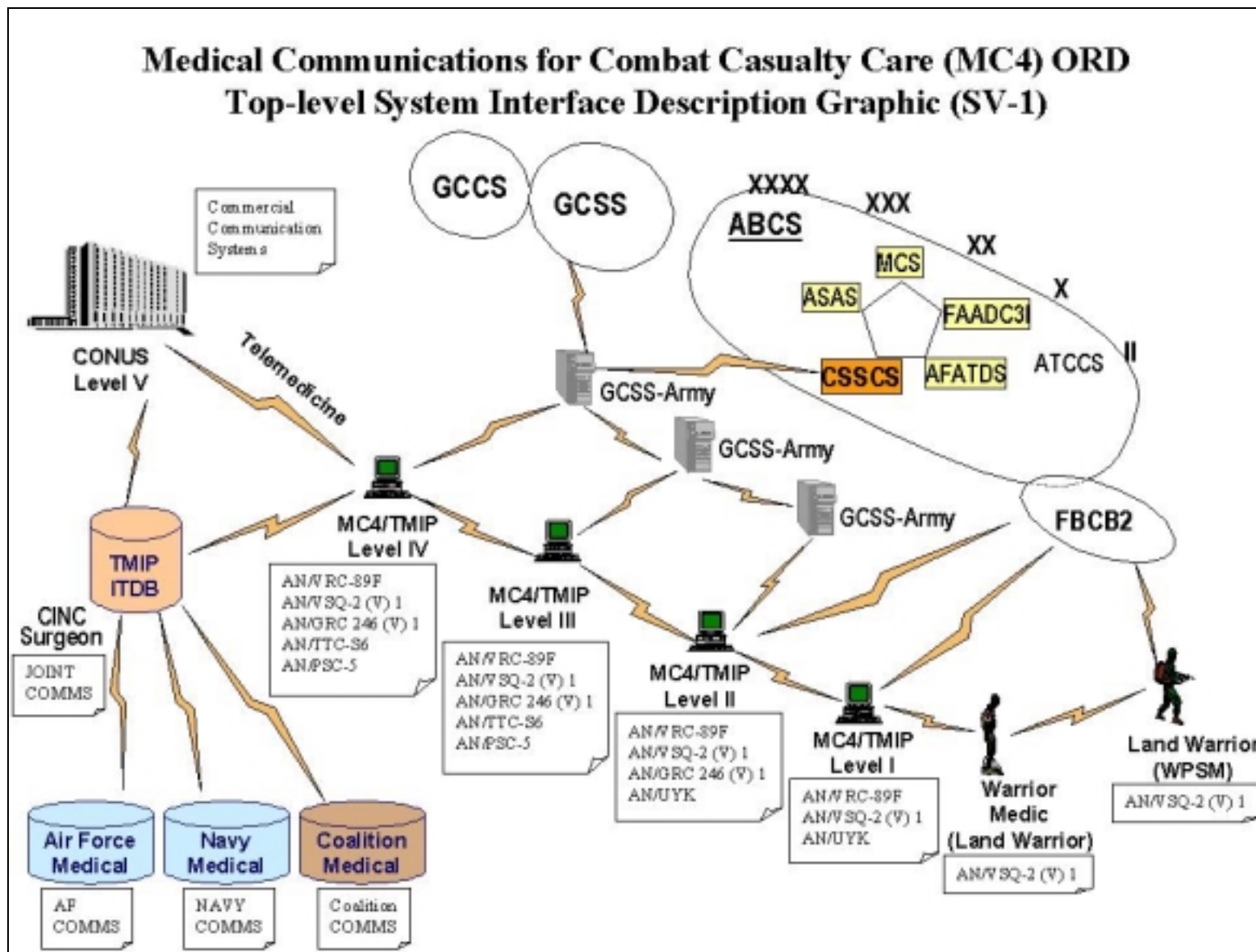


Figure 3: Medical Communications for Combat Casualty Care (MC4) ORD Top-level System Interface Description Graphic (SV-1)



e. Logistics and Readiness.

(1) The MC4 will allow users to perform all basic and required computer functions at least 83 percent of the time in a mobile mode and 95 percent of the time in a static mode. Required usage information is contained in the OMS/MP for MC4. Mission functions performed with the MC4 system are the same in wartime and peacetime; however, the frequency of medical information actions will increase in wartime based on the factors of mission, enemy, terrain, troops, time, and civilian considerations.

(2) Operators and unit maintenance personnel will perform limited maintenance with assistance from the supporting Combat Service Support Automation Management Office (CSSAMO) or designated support activity. The operator/maintainer will conduct Preventive Maintenance Checks and Services (PMCS); will use fault diagnostic tests using maintenance and diagnostic software; and be capable of removal and replacement of line replaceable units (LRUs), i.e. computer, color monitor display, printer, removable hard disk drive from the direct support unit, authorized stockage list (ASL) in accordance with the maintenance allocation chart. The operator/maintainer will also be responsible for installation/replacement of faulty cables and consumable items.

(3) Direct support maintenance of hardware will consist of exchanging the LRU at the Supply Support Activity (SSA) and transferring the failed LRU to the designated depot level repair activity.

(4) General support maintenance will be performed by the contractor for the life of the system and will consist of LRU replacement/repair at the contractor's regional support Center.

(5) Rationale for (2), (3), and (4): The MC4 system will rely on established Army logistics procedures, processes, and systems to maintain automation systems. The stated requirement reflects guidance provided in the draft Special Text 9-11-X, Army Automation Support Procedures.

f. Other System Characteristics.

(1) Survivability. The mission essential resource in the MC4 system is the data resident in the functional modules. Data

loss will be prevented by effective backup procedures. Data survivability against HEMP and NBC contamination will be primarily ensured by effective back-up procedures including interim processes. The MC4 system depends on the WIN for its communications infrastructure. If WIN fails, MC4 must move information via other transfer methods which may slow the reconstruction of some nodes. Mission critical nodes are located at servers with the brigade surgeon, the division surgeon, the corps surgeon, and the Army theater surgeon. Mission critical nodes will be down no longer than 24 hours and non-critical nodes will be reconstituted within 96-120 hours.

(a) High-altitude electromagnetic pulse survivability. The MC4 system is a mission essential system and must continue to function after exposure to HEMP. The HEMP survivability is required for critical node systems; however, operation through a HEMP event is not required. After a HEMP event, full critical node operations must be restored within 24 hours. No data resident on critical node systems can be lost. Processing capabilities at the critical nodes must be maintained and quickly reestablished. Examples of HEMP survivability risk mitigation techniques include, but are not limited to:

i. Use of a different HEMP survivable hardware system to access and use data from the MC4 system. This other system must be located in close proximity to and be accessible from the critical node's location (e.g., Use equipment replaced as a result of modernization as the spare or backup machine. The spare will be kept in appropriate HEMP survivable storage containers at the critical node site.)

ii. Placement of the MC4 system management module servers in hardened shelters (tactical operations centers if available).

iii. Use of HEMP survivable hardware for the MC4 server.

iv. Use of manual tactics, techniques, and procedures (TTPs) to allow the MC4 system operations in a degraded mode.

(b) Nuclear, Biological, and Chemical Contamination Survivability (NBCCS). The NBCCS will be addressed using TTPs. System operators must be able to perform their tasks under Mission-Oriented Protective Posture (MOPP) IV conditions. In the event system equipment/component(s) gets contaminated and

rendered inoperable, the equipment/component(s) will be repaired or discarded. Examples of NBC survivability risk mitigation techniques include, but are not limited to obtaining replacement hardware from the following sources:

- i. Operational readiness float and ASL stocks;
- ii. Cross-leveling computers from non-critical nodes to critical nodes;
- iii. Commercial-off-the-shelf purchased locally;
- iv. Reconstituting by shipping replacement stocks from CONUS.

(c) After the hardware (with software) has been replaced, the data will be restored from either back-up magnetic media or from replication of data residing at the next higher reporting activity. Users and contracting officers will have maximum flexibility in obtaining replacement hardware from the closest, most available source(s).

(d) Rationale: AR 70-75 requires that mission essential systems be HEMP and NBC contamination survivable. The MC4 system must be survivable to the threat levels in its intended operating environment if the users will rely upon it to provide critical information about soldiers.

(2) File Contention.

(a) File Contention occurs when too many messages with too many of the same priorities stack up at a communications transmission point, and then another batch of messages at higher priority arrives, and thus the volume of back up messages creates choke points for the flow of messages in/out or past a transmission point as the priorities and volume resolution takes time when high volume occurs. The CHS information generated by the MC4 system will compete with other STAMIS and C2 information for transmission via limited communications systems. The AMEDD is challenged to continue coordinating with the Army Signal Center to resolve medical information prioritization issues.

(b) Rationale: The Defense Information Systems Agency (DISA) requested that the MC4 ORD recognize the file contention problem in order for the appropriate agencies to initiate procedures to resolve the issue.

(3) Nuclear, explosive, physical and national security needs.

(a) There are no nuclear, explosive, or special physical and national security needs that apply to the MC4 system.

(b) Rationale: The MC4 system is not a weapon system or information system requiring accreditation or special handling regarding the subject areas.

(4) Electromagnetic Environmental Effects (E3) and Spectrum Supportability.

(a) All components of the MC4 system will be designed to be mutually compatible with other electric or electronic equipment within the system's expected operational electromagnetic environment. For all components of the MC4 system that intentionally emit or receive hertzian waves, spectrum supportability within the United States and with all host nations where the system will deploy shall be determined for the life of the system through the Military Communications Electronics Board. The MC4 system shall comply with applicable national and international spectrum management policies and regulation.

(b) Rationale: Access to radio frequency spectrum is declining while demand for spectrum is growing. Systems that require spectrum to operate can not fully meet the warfighters requirement without adequate access to the radio frequency spectrum. Per DODD 5000.2-R, spectrum supportability for a system must be determined prior to initiating cost estimates for development or procurement.

(5) Scalability.

(a) The MC4 system will be scalable to incorporate new Information Management/Information Technology as it matures. The MC4 system must exploit technology innovations to enhance medical information processing. The hardware must support the operating system utilized by the TMIP software, electronic mail, word processing, data processing, and other office automation software when newer software versions released. Within many medical treatment facilities, computer hardware will be digitally connected via a network system (e.g. LAN, hub, and router) to ensure connectivity among the various sections of the medical treatment facility.

(b) Rationale: The MC4 system must be able to accommodate changes or upgrades to TMIP software and interoperability standards. Not only must the MC4 system be able to transmit medical information through the echelons to the ITDB, but it must be able to transmit medical information horizontally throughout medical treatment facilities.

(6) Information Assurance.

(a) The MC4 system will have information assurance. Information assurance is the means to achieve information security by providing protection, and defending information and information systems by ensuring their availability, integrity, authentication, confidentiality, and non-repudiation. It includes providing for restoration of information systems by incorporating protection, detection, and restoration capabilities. Information system protection will be in accordance with requirements established in the ABCS Capstone Requirements Document (CRD), the WIN Operational Requirements Document (ORD), the Protection Plan for Army XXI Information System, Army Digitization Office, 30 September 1997, DODD 5200.28, Security Requirements for Automated Information Systems (AISS), 21 March 1988, and DODI 5200.40, DOD Information Technology Security Certification and Accreditation Process (DITSCAP), 30 December 1997. Information system protection for the MC4 system will be "defense in depth". Protection will include password protection, anti-virus, intrusion prevention, authentication and integrity; on the local area network to include firewalls, encryption, anti-jam, low probability of intercept and low probability of detection; and the wide area network to include intrusion detection, network mapping, and network management. Protection will be a mix of organic MC4 system capabilities and capabilities by supporting information systems to provide for information assurance. The MC4 system will comply with the Department of Defense approved standards for public key infrastructure (PKI) for sensitive, but unclassified (SBU) systems. Medical data, whether on an MC4 computer or on a removable media such as the electronic information carrier, will be encrypted as needed to ensure its protection.

(b) Rationale: Security concerns about medical data affecting readiness of soldiers and units are recognized at the command level. Encryption and other security intrusions/intercepts protection must be provided to any system

communicating medical readiness information.

(7) Natural environmental factors.

(a) The system will operate under battlefield conditions, including adverse weather, dust, and smoke, in accordance with the MC4 OMS/MP.

(b) Rationale: In order to provide medical information to the warfighter, the MC4 system must be able to operate in the same environment as the warfighter.

5. Program Support:

a. Maintenance Planning:

(1) Repair and replacement of all MC4 system components and peripherals in deployable medical units will be performed as prescribed in the maintenance concept in effect at the time of fielding.

(2) The operator and unit maintainer will perform PMCS, conduct fault diagnostics tests and maintenance using contractor-provided software, and repair by removal and replacement of LRUs. Users will be responsible for the installation and replacement of faulty cables and consumable items. The supporting CSSAMO or designated support activity will assist users to determine if problems are related to software or hardware and to expedite the troubleshooting and repair process.

(3) If a hardware problem is identified, the faulty LRU will be returned to the designated repair activity for a replacement item. The designated repair activity personnel will repair the defective LRU. Items under warranty will be forwarded directly to the contractor support facility for repair and return or replacement action. Defective LRU not under warranty will be forwarded from the appropriate maintenance activity to the supporting repair facility having contractual support.

(4) The TIMPO will provide for maintenance support for computer hardware for the sustaining base.

(5) The TMIP Configuration Control Board will support the coordination for maintenance of the MC4 system functional software systems. The TMIP Program Management Office and Program Managers for the TMIP software systems will provide program support for the MC4 system functional software applications. The

Army logistics system will support software application unique to the MC4 system, e.g. interface software with GCSS-A.

b. Support Equipment.

(1) The MC4 system will maximize the use of COTS integrated test, diagnostics, and prognostics to isolate faults to the lowest LRU. Portable maintenance aids with expert system diagnostic capabilities and interactive electronic manuals will be used where they are proven cost-effective.

(2) The MC4 system must be able to operate on 100/120 and 220/240-volt alternating current power sources, 50 and 60 hertz standard U.S. Army tactical and commercial power sources. The switchover between power sources will not interrupt power to the MC4 system server equipment. In the event of a power failure, the servers will use an uninterrupted power supply to allow orderly shutdown in no more than 10 minutes, in order to prevent the loss of data in memory. Electronic equipment will be protected from power transients. A DC source/battery may be required for soldier portable systems.

(3) Procurement of initial and replenishment spares will utilize the Modernization Through Spares acquisition strategy in order to reduce order and shipping costs throughout the life cycle.

c. Human Systems Integration/Manpower and Personnel Integration (MANPRINT).

(1) Manpower/Personnel. The manpower necessary to operate, maintain, support and train the MC4 system will be within the Army's current and projected force structure. Full operational deployment of the MC4 system will not increase the Army's end strength. A system MANPRINT management plan (SMMP) will be required to assess development issues related to human factors engineering, manpower, personnel, training, system safety, health hazards, and soldier survivability. Prescribed MANPRINT analyses will be performed to assess the allocation of functional tasks and the impact upon soldiers, hardware, and software. System managers and network managers may require an Additional Skill Identifier (ASI), and personnel and equipment may require realignment to meet mission needs. It may become necessary to award ASIs to those soldiers who acquire automation skills.

(2) Training.

(a) Training Concept. System design, given the goal of simplicity and intuitiveness, will minimize training costs and time. The training developer will produce a System Training Plan (STRAP) with emphasis on Distance Learning (DL) technologies and digitized exportable training materials to reduce the requirement for trainers to travel to all units receiving the MC4 system. No training devices are required. Multimedia Embedded Training (ET) will be considered for the systems. All training support materials will be developed in accordance with the TRADOC Systems Approach to Training (SAT) process and TRADOC Regulation 350-70, coordinated with the training developer (TD), and delivered in draft prior to test player training for operational test and evaluation. Task Analysis will be performed using the Automated Systems Approach to training (ASAT) database software, provided as GFE. Hands-on training will use the MC4 system for institutional and unit sustainment training. Training courseware will be developed and validated for initial and sustainment training of operators, instructor, key personnel, supervisors, managers, and system support personnel. Doctrine and Tactics Training Concepts will be developed to address specific training requirements to allow for deployment of the unit to support missions.

(b) Instructor Key Personnel Training (IKPT). The IKPT will be provided to instructor and key personnel during testing and fielding phases to facilitate training for new systems or equipment.

i. New Equipment Training (NET). The MC4 system will require operational NET during testing and fielding phases of acquisition. Requirements for NET teams, new materiel and introductory briefing teams, and DL methods of doctrine and tactics training (team or package) will be determined by the proponent in coordination with the materiel developer. The Army NET will be funded, manned, and scheduled by the MC4 Product Manager Office. The proponent will perform validation/verification of the NET materials.

(c) Institutional Training. The MC4 system training will be integrated into the Military Occupational Specialty (MOS) producing courses. Institutional training for the current officer and non-commissioned officer courses will be modified to incorporate necessary soldier training. Institutional training

will be based on data task analysis and knowledge gained from Initial Operational Test and Evaluation (IOT&E). The fielding of the MC4 system impacts the following MOSs:

- i. 71G - Patient Administration Specialist
- ii. 76J - Medical Supply Specialist
- iii. 91B - Medical Specialist
- iv. 91C - Practical Nurse
- v. 91D - Operating Room Specialist
- vi. 91K - Medical Lab Specialist
- vii. 91M - Hospital Food Service Specialist
- viii. 91P - Radiology Specialist
- ix. 91Q - Pharmacy Specialist
- x. 91R - Veterinary Food Inspection Specialist
- xi. 91S - Preventive Medicine Specialist
- xii. 91T - Animal Care Specialist
- xiii. 91V - Respiratory Specialist
- xiv. 91W - Trauma Specialist/Health Care Specialist

(current 91B and 91C)

- xv. 91X - Mental Health Specialist
- xvi. All AMEDD Officers Area of Concentration

(d) Unit/Sustainment Training. Validated system training support material, consisting of digital technical documentation, extension training materiel, digitized training literature publications, and other training products to be identified in the systems training plan, will be developed for concurrent testing and fielding with the MC4 system. Multimedia ET will be considered as a training support means for the systems. A complete copy of the system extension training package for those tasks not selected for ET, including programs of instruction, lesson plans, and user manuals, will be provided to units that can be used on any Windows based operating system for unit

sustainment training. Commanders of TOE/TDA units are responsible for conducting unit sustainment training as necessary. The (system/personnel) training packages provided by the proponent school will be used for support training in the units.

(e) Doctrine and Tactics Training (DTT). Doctrine will require updating to reflect MC4 system technology into the health care process. The authoring system and the delivery media for the DTT will be the same as those for institutional and unit training. The DTT is the responsibility of the proponent and will be incorporated into the Test Training Support Package for the Initial Operational Test and Evaluation. The DTT will consist of operator training on tactics, techniques, and procedures to employ the MC4 system. Medical officers and select leaders will be trained on the capabilities and employment consideration for the MC4 system. The DTT should be added to the unit's Mission Essential Tasks List to ensure inclusion in Professional Development training. The DTT will address the use of manual TTPs to allow MC4 system operations in a degraded mode. The NET DTT will consist of an introduction to the system architecture, inputs, outputs, capabilities and effective management techniques. The DTT will be provided to commanders and staff at each unit receiving the MC4 system.

(f) System Extension Training (SET). The Product Manager MC4 will provide a training team to conduct operator, supervisor/manager, commander and staff, and system administration training for each training location. The training packages will include all critical tasks identified during the Front End Analysis and the design and development efforts that were selected for training.

(g) Training Constraints.

i. All currently envisioned training is contingent upon 100% availability of the resources identified in the STRAP.

ii. Schoolhouse training is constrained by the availability of trained instructors, equipped classrooms, and available hours. The AMEDDC&S may find time for MC4 training by replacing instruction on legacy systems and incorporating familiarization into existing professional development courses.

iii. The reading grade level (RGL) for all support documents, to include the training package, will not exceed the

9th grade reading level.

iv. The MC4 system must exist within current manpower limitations.

v. Training should be designed to ensure Reserve Component personnel can train within available specified annual and monthly training periods.

vi. Computer competency is not yet universal in soldier training. Computer literacy and basic desktop familiarization training is necessary for all users attending MC4 training.

vii. The MC4 system design features to include controls, displays, cabling configuration(s), and required operating procedures will not induce operator errors, introduce interface problems, or noticeably increase mental or physical workload. The soldier-machine interface (SMI) should be user friendly and respect appropriate design guidance. The Human Factors Engineering (HFE) evaluation will ensure soldier capabilities are not exceeded.

viii. The MC4 system will be designed in accordance with all applicable safety standards so as to minimize safety risks to operator and maintenance personnel during the system's life cycle. A system safety assessment will evaluate the safety risks to the user. The system shall be designed to eliminate or control all potential health hazards including electrical shock, noise, heat, and toxicity. The health hazard assessment (HHA) will be completed as early as practical in the program to identify potential health hazards. The HHA will be updated prior to each milestone review.

ix. Additional training constraints may be added as the SMMP tracks the development of the MC4 system. Any additional training constraints will be documented in both the STRAP and the SSMP.

(3) Human Factors Engineering. The MC4 system design features, to include controls, displays, cabling configurations(s), and required operating procedures will not induce operator errors, introduce interface problems, or noticeably increase mental or physical workload. The SMI should be user friendly and respect appropriate design guidance. The HFE evaluation will be done to ensure that soldier capabilities

are not exceeded and characteristics are accommodated.

(4) Health Hazards/System Safety. The MC4 system will be designed in accordance with all applicable system safety standards to minimize safety risks to operating/maintenance personnel during the system's life cycle. A system safety assessment will be conducted to evaluate the safety risks to the user. The system shall be designed to eliminate or control all potential health hazards including electrical shock, noise, heat, and toxicity. The HHA will be completed as early as practical in the program to identify potential health hazards and will be updated prior to each milestone review. Any residual safety and/or health hazard risks or problems must be clearly identified in training efforts and support material and be manageable.

(5) Soldier Survivability. Installation, operation or use, and support or maintenance of the MC4 system must not increase any risk to soldier survivability, to include likelihood of detection, targeting, or injury. Operators/users must be able to effectively perform all mission critical tasks while in MOPP IV. The MC4 system is specifically intended to enhance soldier survivability on the battlefield through rapid and accurate identification and evaluation of casualties, efficient triage, and improved medical logistics.

d. Computer Resources. The MC4 system software and hardware will be developed for interoperability with military and commercial computer systems to include communications network systems.

(1) Computer Constraints. The MC4 system will conform to DII COE (minimum level 6) specifications. It must be able to operate under the same operating systems as the TMIP software.

(2) Database Constraints. No more data will be stored at any level than is necessary to perform functions at that level. Processing of time critical data will be accomplished as close to the source of data entry as possible.

(3) Architecture Constraints. The MC4 system will comply with the JTA/JTA-Army and have open system architecture to facilitate both hardware and software technology insertion.

(4) Interoperability Constraints. The MC4 system will be interoperable with the ABCS, WIN, and the TI. The ABCS systems

with which the MC4 system will be interoperable include GCCS-Army, FBCB2, and CSSCS. Through integration with the Joint TMIP information systems, the MC4 system will assist in providing a global capability linking information databases and integration centers that are accessible to the warfighter and health care provider. The MC4 system will be interoperable with One Tactical Engagement Simulation System, Home-station Instrumentation Training System, and Combat Training Center - Instrumentation System. These systems support training with the MC4 system under realistic battlefield conditions. Consideration must also be given to the interservice, joint, and coalition product and system integration to include system administrators.

(5) Mission Critical Resources. None are identified.

(6) Support Computer Resources. Acquisition focus will optimize total system performance by close adherence to the ILS elements: supply provisioning, technical documentation, facilities preparation, and availability of standard tools, and test, diagnostic, and associate support equipment.

(7) Automated Test Equipment. The MC4 system will have an integrated diagnostic test capability.

(8) Integrated Computer Resources Support. Interactive electronic technical manuals will be reviewed as a means to trouble-shoot system problems.

(9) System Interface Requirements. Specific interfaces and information exchange requirements between the MC4 system and other automated information systems will be documented in compliance with the Command, Control, Communications, and Computers Requirements Definition Program. Unique systems interfaces must be certified by the Joint Interoperability Test Command (JITC).

e. Other Logistics Considerations.

(1) Provisioning strategy. System consumables and expendables will be provisioned at Defense Logistics Agency activity or General Supply Agency. System hardware will not be provisioned at wholesale levels. Repair parts will be acquired on an as-needed basis by the depot level repair activity to repair or replace the hardware component.

(2) Unique facility, shelter, or environmental compliance

requirements. There are no unique facility, shelter or environmental compliance requirements. The MC4 system will operate from existing sheltered and semi-sheltered environments in garrison or the field using available power sources and telecommunications.

(3) Special Packaging, Handling, and Transportation. The MC4 system hardware must be transportable in its transit case as restrained cargo in vehicles over primary roads, secondary roads, and cross country and by air, ship and rail. The MC4 system hardware will not require padded transportation containers, which exceed COTS standards, unless being air-delivered by special methods such as airdrop operations. Standard rigging procedures will be employed to withstand hard landings during aerial delivery operations. At division and below level, no packaged component of MC4 will be rated more than two-person carry. At EAD, no packaged component of MC4 will be rated more than four-person carry.

f. Command, Control, Communications, and Intelligence. The MC4 system will interface or be interoperable with existing and proposed C4I systems within the Army, other DOD Services, selected joint and allied C4I subsystems. MC4 will supply medical situational awareness and medical unit status data to CSSCS through an interface with GCSS-A. There will be no direct interface with any ABCS. While the MC4 hardware will be an Army unique program, the MC4/TMIP system will interface with other Service and Allied medical information systems through a common link to the TMIP Interim Theater Database. Medical information sent to the ITDB by one Service will be retrievable by authorized personnel from any of the other Services.

(1) Initially text and later digitized voice and image transmissions will be sent and received by the MC4 systems. The MC4 system will meet the required Security Policy for interfacing with other C4I systems. The transfer of medical information will be over existing and emerging tactical, strategic, and commercial communication networks. The MC4 system will use data standards in the MIL-STDS and Technical Interface Design Plans (TIDP).

(2) At division and below, MC4 will replace a paper-based manual system. It will therefore increase the transmission requirements of the supporting communications infrastructure. At echelons above division MC4 will replace current medical

information systems as well as provide new functionalities. This will also increase the communications requirement. The extent of these increases will be determined as MC4 Operational Facilities (OPFAC) rules are built and entered into the Signal Center's Command, Control, Communications, and Computers Requirement Determination Process (C4RDP) system.

(3) Forward of the divisional medical company (FSMC, MSMC) MC4 will utilize radio networks where available, including the current FM Single Channel Ground Airborne Radio System (SINCGARS)/Enhanced Position Location Reference System (EPLRS) network as well as the future Near Term Digital Radio (JTRS). Where radio networks or sufficient bandwidth are not available MC4 will transfer medical information via removable media such as floppy disk, ZIP disk, tape, etc. This information will be moved in this manner until it reaches a location where it may be transmitted electronically.

(4) Under normal circumstances MC4 computers located at the divisional medical companies and rearward will have access to a non-medical local area network (LAN). These LANs will be used to transmit the generated MC4 information. The MC4 computers will need the same network support as any other network user. In the near term, the transmission of MC4 information will be via Multiple Subscriber Equipment (MSE) systems. In the future, transmission will be via the Warfighter Information Network - Terrestrial (WIN-T).

(5) The Corps and Theater Combat Support Hospitals (CSH) represent the one instance where MC4 will operate on a purely medical LAN. The CSH network is run and maintained by network personnel organic to the hospital. The CSH LAN will use the available Army communications infrastructure to send and receive information external to the hospital.

g. Transportation and Basing. The MC4 system must be transportable worldwide by all modes. When being transported, it must be in its transit case as restrained cargo. When rack-mounted it can be moved in the Standardized Integrated Command Post System family of shelters vehicle. When embedded in vehicles or aircraft, the configuration of the MC4 system must be compatible with other platform-mounted components and the onboard electrical power source to include battery backup requirements. In garrison, the system will operate from within fixed facilities using available power sources. Standard Army

power generation equipment, mobile platforms, tents, shelters, available buildings, and other form of shelter will be used in the tactical environment.

h. Standardization, Interoperability, and Commonality. The MC4 system will comply with provisions contained in JTA, version 3.1, dated 31 Mar, 2000, to include DII COE (minimum level 6) compliance. To achieve full operational capability, the MC4 system will interface with other Army and DOD information management systems. The MC4 system must use standard DOD, communications networks and standard Army tactical communications equipment and procedures. Standardization, interoperability, and commonality with other Services and allied nations will be through the use of the Joint TMIP software and a common interface with the Interim Theater Database. The Joint Program Designation for the other Services is Joint Interest. MC4 will provide medical situational awareness and medical unit status information to Army and Joint command and control systems through its interface with GCSS-A. The information passed to GCSS-A will feed the common operational picture (COP). MC4 itself will not have a direct interface with the Army Battle Command Systems or Joint systems such as GCSS (see Figure 2, Operational Concept View and Figure 3, System Interface Description).

i. Certification and Accreditation. The MC4 system, as an information technology will undergo a security certification and accreditation process as specified by DoDI 5200.40.

j. Geospatial Information and Services. None required.

k. Environmental Support. No requirement exists for any specific weather, oceanographic, or astrophysical support. The MC4 system user will require access to only standard weather information for the area of operations, such as local weather conditions, forecasts, warning, watches, and advisories, to support medical C2 activities.

6. Force Structure. The MC4 system program will be fielded to a total of 1053 medical units/activities, both Active and Reserve Component forces. The total number reflects MRI units in support of Force XXI, which will form the basis for supporting Army, 2010 and beyond. Of the total number, 642 are divisional units - maneuver battalion medical platoons, combat support unit medical platoons, division support medical companies, and

forward support medical companies. The MC4 system will be fielded to 37 combat support hospitals and 343 various corps medical units. These units include area medical support, air and ground medical evacuation, forward surgical teams, medical logistics, preventive medicine, combat stress control, dental, veterinary, medical surveillance, special treatment teams, medical detachments telemedicine, and medical command and control. Thirty-one echelon above corps medical units will receive the MC4 system. These units include medical command and control, medical logistics, veterinary, medical laboratory, and Special Operations Support Battalion. The MC4 system will be fielded according to the system allocation plan depicted in table 3. Systems numbers reflect quantities per individual unit. With maturation of the MC4 program, more definitive numbers of systems and other logistics requirements will be identified.

Table 3. Systems Application by Unit

Systems Application Quantities										
Unit	Outpatient	Inpatient	Immunization	Survey	Medical Logistics	Blood Management	Patient Movement	Force Health	Hands-free data collection	Office Suite
Division										
Medical Platoon (Mech)	10		4		1		1	1	32	4
Medical Platoon (Ar)	10		4		1		1	1	32	4
Medical Platoon (Cav)	10		4		1		1	1	32	4
Medical Platoon (DIVARTY)	3		2		1		1	1	6	2
Medical Platoon (FA BN)	3		2		1		1	1	12	2
MLRS BN	3		2		1		1	1	12	2
Signal BN	2		2		1		1	1	10	2
ADA BN	2		2		1		1	1	8	2
Aviation BDE	2		2	1	1		1	1	5	2
Attack Helicopter BN	2		2		1		1	1	4	2
Division Surgeon	5		3	1	1		1	1	4	6
Brigade Surgeon	3		2	1	1		2	1	1	3
Med Ops Cell	1			1						1
Med Materiel Mgt Branch					1		1			1
Forward Support Med Co	21		9	3	3		1	2	57	19
Division Support Med Co	27		14	2	5		1	2	76	27

Corps										
Medical Brigade	4		1	1	1	1	1	2	6	11
Corps Surgeon Section	2		2	1		1				4
MEDCOM	4		1	1	1	1	1	1	22	10
Evacuation BN	1		1	1	1	1	1	1	6	6
Area Support Medical BN	3		1	1	2		1	1	17	9
Area Support Medical Co	14		5		1		1	1	58	10
Area Support Medical Det	10		3		1		1	1	35	6
Air Ambulance Co	13				2		1		38	7
Air Ambulance Co (UH-60), Air Assault Div	13				2		1		38	7
Ground Ambulance Co	42				1		1		48	5
Combat Support Hospital		76	42	4	25	4	1	4	111	90
Forward Surgical Tm (ABN)	5				3				20	5
Medical Det Minimal Care	4		1		1		1		18	5
Medical Logistics BN					8	1				8
Medical Logistics Co					20	2				23
Logistics Support Co					30					7
Blood Support Det					1	3			15	6
Preventive Med Det	4		4	4	1			4	12	3
Combat Stress Control Co	15				1			1	72	3
Combat Stress Control Det	8						1	1	36	9

Corps										
Dental Co (Area Support)	18		14	1	2		1		45	26
Veterinary Support BN					4			3	67	7
Forward Surgical Tm	7		5		3				20	5
Head and Neck Tm	8				1				19	3
Special Care Tm	3				1				11	2
Renal Tm	1				1				5	1
Inf DIS Tm	1				1				3	1
Pathology Tm	3				1				10	3
Medical Det, Telemedicine	8								7	8
EAC										
Medical Brigade	4		1	1	1	1	1	2	6	11
MEDCOM	5		1	1	2	1	1	2	25	28
Medical Logistics BN					8	1				8
Medical Logistics Mgt Cntr					4	1				4
Area Medical Laboratory	3		1	1	1	1		4		4
Combat Support Hospital		76	32	4		4	1	1		90
Special Ops Support Bn	3		1		1					5

7. Schedule Considerations.

a. The MC4 system will employ a three-block incremental development approach that incorporates the spiral systems engineering life-cycle methodology designed to reduce development risk, improve manageability, increase maintainability, and accelerate benefits to the warfighter. The MC4 system will be the Army's medical information system to modernize, digitize, and integrate medical information and make it available for the warfighting commander's use.

(1) Block 1 will provide limited health care functional capability by FY 2001 for corps and below medical units. It will also include command and control functional capabilities at the CINC/JTF commander level. Functional capabilities in Block 1 are depicted in the following paragraphs. The MC4 system Initial Operational Capability (IOC) will be realized in Block 1 with the fielding of MC4 to III Corps, the Army's First Digitized Corps (FDC). Achieving IOC will occur in two phases. The first phase will be the Block 1 fielding to the 4th Infantry Division, the First Digitized Division (FDD), and other selected III Corps units at Fort Hood, Texas, in FY 2000. This must occur in order for these units to participate in the Digitized Division Capstone Exercise scheduled for FY 2001. The second phase of the IOC will be the Block 1 fielding to the entire (remaining) III Corps units.

(a) Command and Control. The IS will provide the capability to receive, process, display, and analyze situation information to assist commanders in the decision making process. Functions include but are not limited to: medical planning, collaborative planning, calculation of time-phased medical requirements, and analysis of medical sustainability and supportability assessments. This is particularly significant in the event the Army Component Commander is designated as the JTF commander.

(b) Health Care Delivery. Health Care Delivery will be provided for corps and below medical units. The IS will be partially integrated to support the protection and monitoring of the health of soldiers and the provision of health care. Functions include but are not limited to: electronic data storage device (EIC) interface, tracking of patients, collection and documentation of health data, reporting of patient disposition, immunization tracking, and management of blood and

blood products. All functional capabilities in this category will enhance clearing the battlefield and returning the soldier to the fight as quickly as possible.

(c) Medical Logistics. Medical Logistics for division and below will be provided. The IS will support the provision of medical equipment and supplies in a timely manner. Functions include but are not limited to: resupply management, medical logistics inventory management, medical logistics assembly management/quality control, blood management, and product identification/storage. Application of medical logistics automated information systems in support of throughput distribution will help decrease the medical footprint on the battlefield by eliminating stockpiles of medical supplies.

(d) Interfaces. During the fielding of Block 1, the MC4 system will begin interfacing with external systems so users can access information and exchange operational data in the areas of combat service support and tactical C2. Some examples of these interfaces are the soldier's electronic data storage device (EIC), CSSCS, and GCSS-A.

(e) Telecommunications. Existing tactical and operational telecommunications systems, to include the high frequency radio as an interim capability, will be used to exchange medical information.

(2) Block 2 will provide additional health care functional capabilities for sustaining base and below medical units by FY 2003.

(a) Health Care Delivery. The health care delivery information system will be fully integrated to include the sustaining base.

(b) Medical Logistics. Medical logistics capability will be expanded to corps and theater medical units. A patient movement item (PMI) management capability will be added to the medical logistics functional area.

(c) Patient movement. Information systems will provide the capability to effectively and efficiently execute the process of patient movement from the point of injury/entry into the system to the final destination medical treatment facility. Functions include but are not limited to visibility of casualties, tracking evacuation missions, and planning

evacuation missions. Joint interoperability will be established between the Army, the Air Force strategic patient lift system, and the Navy shore to ship patient system.

(d) Interfaces. The MC4 system will interface with additional information systems to further expand the capability to exchange operational and tactical data. These interfaces include FBCB2, GCCS-Army, and TRAC²ES.

(e) Telecommunications. Interim satellite technology will be used to support primarily the MDT operations. Additional telecommunications capabilities required to support telemedicine include a digital camera, a video camera, a VTC, and a monitor.

(f) Telemedicine. Digital diagnostic equipment will be available for use by the MDT, to provide on-site access to remote medical and health specialists' consultations or procedural mentoring. Digital equipment items and digital enablers bring state-of-the art medical capability to the forward areas while avoiding the up front cost of replacing current analog equipment. Equipment required includes a scope imaging system, an ophthalmoscope, an ENT scope, a dermascope, a stethoscope, an X-ray digitizer, a cardiac monitor, and a teledentistry camera set.

(3) Block 3 will provide the following capabilities to the sustaining base and below medical units by FY 2010. The Full Operational Capability (FOC) will be realized in this block when all MC4 blocks are fielded to all medical force structure units.

(a) Force health protection. Information systems will be implemented to initiate a comprehensive medical surveillance program for monitoring mental and physical health status, the occurrence of illness, injury, and disease as well as the identification and assessment of potential hazards and actual exposures to environmental, industrial, and NBC contaminants and stressors. These systems will be effective in the collection and analysis of health status and threat information supporting military operations during the full cycle of pre-deployment, deployment, employment, and post-deployment activities.

(b) Hands-free data collection. The MC4 system will insert voice-activated technology into the personally carried computer used by the combat medic, health care provider, and other medical personnel. This will significantly reduce the amount of time required to enter applicable diagnostic,

treatment, and evacuation information associated with the treatment of a casualty.

(c) Interface. The MC4 system will interface with the Computer-based Patient Record, the Warrior Systems (Land Warrior, Mounted Warrior, Air Warrior), and sustaining base automated information systems.

(d) Telecommunications. With the complete fielding of WIN to the entire force structure, the telecommunications connectivity provided by the MDT can be eliminated.

b. In summary, the MC4 system IOC will be met in FY 2001 with the fielding of Block 1 to III Corps, the FDC; the FOC will be achieved by FY 2010 with the fielding of all three MC4 system Blocks to all medical force structure units. The projected fielding for the MC4 system will fully support the Army Digitization Master Plan and the Army, 2010 and beyond. Planning factors are subject to revision as a result of changes in future defense planning guidance, funding, congressional mandates, and force structure authorizations. The proposed functionality schedule for MC4 is reliant on the development and fielding of the TMIP software. Any alteration in the TMIP schedule will affect the delivery of MC4 functions.

8. Program Affordability.

a. The MC4 costs (Table 4) represent total life cycle costs, over a twenty-year period (FY00-FY20), to provide MC4 capabilities to the entire force. Costs are stated as threshold and objective values. The objective cost is based on the draft Life Cycle Cost Estimate (LCCE) for Army implementation of TMIP minus Military Pay. The objective cost also includes costs in FY99-FY00 to acquire high frequency (HF) radios and costs in FY03 and FY05 to acquire MC4 infrastructure to support Medical Detachment, Telemedicine requirements. The threshold cost represents the maximum cost for the MC4 program and is based on the objective cost plus 25%. The objective cost reflects the level the materiel developer will try to achieve through the use of COTS/GOTS equipment and leveraging existing Army programs.

b. The twenty-five percent increase from objective to threshold costs is based on PEO STAMIS standard practice for programs of this nature where uncertainty exists in the following areas:

(1) The TMIP software will be developed in increments or blocks. Full implementation of all blocks may require more data storage and processing capabilities than are supported by the currently defined objective MC4 capability.

(2) Proposed Army doctrinal changes to the size and composition of divisions, as well as other proposed force structure changes could increase the amount of MC4 automation/communications infrastructure required.

c. Factors considered in determination of costs include the following:

(1) Costs shown are for infrastructure supporting Army users of TMIP and other MC4 supported capabilities. The TMIP software costs, to include acquisition, maintenance, and customer support, are specifically excluded from this estimate and will be funded separately by the Office of the Undersecretary of Defense for Health Affairs and provided at no cost to the Army.

(2) Replacement of automation hardware will be on a 5 year cycle, COTS software on a 3 year cycle, and communications (LAN) hardware on a 6 year cycle.

(3) The MC4 system will use Army and joint battlefield communications networks for data transmission with no additional long haul communications costs to MC4.

(4) Cost data excludes integration/interface costs to pass data to external systems (eg. GCSS-A, CSSCS) as data transfer costs are a requirement of the system requiring the data.

(5) Cost data includes costs for initial purchase only of high frequency radios acquired for Force Package I and II medical personnel in FY99 and FY00.

(6) Cost data includes cost for initial purchase only of MC4 infrastructure supporting Medical Detachment, Telemedicine requirements.

(7) Cost data includes FY 1998/99 sunk costs (PM office, system engineering costs, and purchase of HF radios).

(8) The O&S costs include user reimbursement to the Communications and Electronics Command for non-warranty maintenance, and sustainment user training. They also include

central management of the MC4 mission after achievement of FOC.

(9) Cost data is based on automation hardware procured with a five year warranty, COTS software with three year user support, and LAN hardware with six year warranty.

(10) Cost data excludes acquisition or integration of hands-free technology, as costs for this emerging technology could not be reasonably defined.

Table 4: The MC4 System Estimated Program Costs

COST APPN	Milestone II Baseline 10/1/99	
	Objective	Threshold
Then Year \$M		
(1) RDTE	\$0.0	\$0.0
(2) Procurement OPA	\$562.2	\$702.8
(3) MILCON	\$0.0	\$0.0
(4) Acquisition OMA	\$67.2	\$84.0
(5) Total Acquisition Cost ^(a)	\$629.4	\$786.8
(6) O&S	\$166.8	\$208.5
Base Year FY00 \$M		
(1) RDTE	\$0.0	\$0.0
(2) Procurement OPA	\$431.6	\$539.5
(3) MILCON	\$0.0	\$0.0
(4) Acquisition OMA	\$58.5	\$73.1
(5) Total Acquisition Cost ^(a)	\$490.1	\$612.6
(6) O&S	\$123.9	\$154.9
(7) Total Life Cycle Cost ^(b) (includes \$12.1M sunk cost)	\$626.1	\$779.6
^(a) Total Acquisition costs include all costs except Operations and Support (O&S)		
^(b) Total Life Cycle Cost is for the period FY00 through FY20		

ANNEX A

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ANNEX B

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U.S. Navy Medical Logistics Command, Code 03, Fort
Detrick, Frederick, MD 21702-5015

Marine Corps Combat Developments Command, Requirements
Documents Division-MCCDC, 3300 Russell Road, Quantico,
VA 22134-5021

Hqtrs, U.S. Air Force, ATTN: SGX, 110 Luke Avenue, Suite
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ANNEX C

LIST OF ORD SUPPORTING ANALYSIS

In 1995 the Army Medical Department Center and School funded a two year study to determine the theater information management/information technology (IM/IT) requirements of the AMEDD. The study, performed by Klynveld, Peat, Marwick, and Goerdeler (KPMG), consisted of user surveys and user interviews. Of the 328 IM/IT requirements captured in the final report, *Army Theater Medical Information Program User Requirement Report*, 223 were submitted to the TMIP PM Office as Army TMIP requirements to be included in the TMIP software specifications. The other 105 requirements, listed below, were determined to be Army unique. These requirements were used to formulate the key performance parameters for the MC4 program listed in paragraph 4 and in Annex E.

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Logistics/ Blood Management	Compatibility	Interoperability Capability	Interface with Army Tactical Command and Control System common hardware/software (ATCCS CHS).	Compatible with ABCS
Laboratory	Compatibility	Link with Joint Forces Systems	Provide the Area Medical Laboratory with access to a situational awareness report.	Compatible with CSSCS
Hospitalization	Compatibility	Situational Awareness	Provide access to a system which provides situational awareness and command and control.	Compatible with CSSCS
Hospitalization	Compatibility	Automated Info System Linkage	Provide higher headquarters with a total picture of workload.	Compatible with CSSCS
Hospitalization	Compatibility	Automated Reports - Weather Reports	Provide access to information systems containing weather information, situation reports, and intelligence summaries.	Compatible with CSSCS

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Hospitalization	Compatibility	Automated Reports - Situation Reports	Provide access to information systems containing weather information, situation reports, and intelligence summaries.	Compatible with CSSCS
Hospitalization	Compatibility	Automated Email	Provide access to an automated system for exchanging both verbal and written mail messages.	Compatible with e-mail system
Patient Treatment and Area Support	Compatibility	FBCB2 Interface	Provide a combat medic access to an information system, capable of integration with FBCB2 (Force XXI Battle Command - Brigade and Below) on one hardware platform.	Compatible with FBCB2
Patient Treatment and Area Support	Compatibility	FBCB2 Interface	Provide treatment teams (medical platoon and medical company) with access to an information system, capable of integration with FBCB2.	Compatible with FBCB2

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Compatibility	FBCB2 Interface	Provide an information system capable of integration with FBCB2 on the one hardware platform, for the medical platoon headquarters to command and control treatment teams, ground evacuation platforms, and combat medics. Provide the platoon leader, field medical assistant, and the platoon sergeant the use of this information system.	Compatible with FBCB2
Patient Treatment and Area Support	Compatibility	FBCB2 Integration	Provide medical company headquarters with access to an information system, capable of integration with Force XXI Battle Command - Brigade and Below on the one hardware platform, for command and control of the medical company (FSMC, DSMC, and ASMC).	Compatible with FBCB2

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Compatibility	FBCB2 Integration	Provide ground evacuation platforms with access to an information system, capable of integration with FBCB2 on one hardware platform, for wheeled and tracked ground evacuation platforms of the medical platoon and medical company.	Compatible with FBCB2
C4I	Compatibility	GCCS/GCSS Compatibility	Be compatible with the established Global Command and Control System (GCCS) and the envisioned Global Combat Support System (GCSS) to support advanced models and simulations and analysis.	Compatible with GCCS and GCSS
Dental Services	Compatibility	Access to Army Logistics Database	Provide access to the Army's logistics and medical logistics database for support.	Compatible with GCSS-A
Evacuation	Compatibility	Access to Army Class IX Supply System	Provide access to Army Class IX supply system to requisition repair parts and determine repair parts status.	Compatible with GCSS-A

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Combat Stress Control	Compatibility	Access to Individual Soldier Personnel Records	Provide access to individual soldier personnel records and unit status reports to increase the effectiveness of prediction, treatment and return to duty.	Compatible with GCSS-A
Combat Stress Control	Compatibility	Access to Unit Status Reports	Provide access to individual soldier personnel records and unit status reports to increase the effectiveness of prediction, treatment and return to duty.	Compatible with GCSS-A
Patient Treatment and Area Support	Compatibility	Medical Device Interface	Provide treatment teams (medical platoon and medical company) with an interface with patient-connected medical devices.	Compatible with patient connected devices
Patient Treatment and Area Support	Compatibility	Medical Device Interface	Provide ground evacuation platforms with an interface with medical devices.	Compatible with patient connected devices

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
C4I	Compatibility	Compatible Communications	Provide access to a compatible communications connectivity with other Services, allied and coalition forces.	Compatible with TMIP
C4I	Compatibility	Compatible Communications	Provide access to communications connectivity with Army, Joint, host nation elements, and other government and non-government agencies.	Compatible with TMIP
Logistics/ Blood Management	Compatibility	Access to EAC Transportation Information	Provide access to Division, Corps, and Echelon Above Corps (EAC) transportation information.	Compatible with transportation AIS
Logistics/ Blood Management	Compatibility	Automated Requisition System for Class IX Resupply	Provide access to an automated requisition system (e.g., ULLS G) for resupply of class IX to expedite requisition of required equipment parts.	Compatible with ULLS-G

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Combat Stress Control	Compatibility	Communications Between CSC Personnel and Home Stationed Counterparts	Provide access to a voice and data communications network which allows deployed CSC personnel the ability to communicate with counterparts at home station to resolve soldiers' home front problems.	Compatible with WIN-T
Patient Treatment and Area Support	Compatibility	WPSM Interface	Provide mental health/combat stress control units with an interface with the Warfighter Physiological Status Monitor to receive information about casualty occurrences and the details of the recent physiological status of casualties.	Compatible with WPSM and Land/Air/Mounted Warrior
Patient Treatment and Area Support	Compatibility	WPSM Interface	Accept information from the Warfighter Physiological Status Monitor.	Compatible with WPSM and Land/Air/Mounted Warrior

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Compatibility	WPSM Interface	Provide the interface between the Combat Health Support system and the Warfighter Physiological Status Monitor of the Warrior systems - Land Warrior, Air Warrior, and Mounted Warrior.	Compatible with WPSM and Land/Air/Mounted Warrior
Hospitalization	Echelon I/II	Monitoring Patient Data	Provide access to a system that provides patient monitoring data from the evacuation platform to the next appropriate treatment level.	Enroute monitoring
Patient Treatment and Area Support	Echelon I/II	Medical Database	Provide a combat medic and mental health/combat stress control units with access to a medical database to maintain a record of patients treated by the combat medic and to record information received from the medical platoon about casualties about to return to duty.	Local database

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Echelon I/II	Medical Database	Provide treatment teams (medical platoon, medical company, mental health, and combat stress control teams) with access to a medical database to maintain a record of patients treated by the treatment team and to record information received about incoming patients.	Local database
Patient Treatment and Area Support	Echelon I/II	Individual Medical Readiness	Provide treatment teams (medical platoon, medical company, and mental health sections) with access to a database of the individual soldier medical readiness information of all unit personnel to update medical readiness information whenever there is a change in the medical status of a soldier.	Local database

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Echelon I/II	Treatment Team/Patient Record Interface	Provide treatment teams (medical platoon and medical company) with integration to host communications devices to communicate with the central patient record to access past medical history and to record new patient information.	Local database
Patient Treatment and Area Support	Echelon I/II	Medical Platoon Communications	Provide the medical platoon headquarters with integration to host communications devices to communicate with the medical databases of combat medics, evacuation platforms, and treatment teams to obtain information about their activity levels.	Local database

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Echelon I/II	EIC Interface	Provide a combat medic and mental health/combat stress control units with access to an interface with the EIC (Electronic Information Carrier) of the patient record system to record patient treatment information and to read selected information about current medical treatment.	EIC Interface
Patient Treatment and Area Support	Echelon I/II	EIC Interface	Provide ground evacuation platforms with an interface with the EIC (Electronic Information Carrier) of the patient record system to record patient treatment information, to include en-route care, and to read selected information about current medical treatment.	EIC Interface

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Echelon I/II	Treatment Team/Evacuation Integration	Provide treatment teams (medical platoon and medical company) with integration to host communications devices to communicate with evacuation platforms for the hand over of patients being evacuated to/from the treatment team.	TAC Internet
Evacuation	Echelon I/II	PRE to HCD Duplicate of Hospitalization 44	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TAC Internet
Evacuation	Echelon I/II	En Route Communications	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TAC Internet
Evacuation	Echelon I/II	Enhanced Patient Monitoring, Treatment, and Gathering of Information	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TAC Internet

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Evacuation	Echelon I/II	HCD to PRE Duplicate of Hospitalization 46	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TAC Internet
Evacuation	Echelon I/II	En Route Monitoring and Treatment Capability	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TAC Internet
Hospitalization	Echelon I/II	DD1380 Data	Provide access to the automated field medical card (1380 data) at the POI and throughout Levels I/II, in order to create a historical archive.	TMIP Requirement
Hospitalization	Echelon I/II	PRE to HCD	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TMIP Requirement

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Hospitalization	Echelon I/II	HCD to PRE	Be capable of transmitting and receiving current medical record information between patient evacuation platforms and health care providers at all echelons.	TMIP Requirement
Patient Treatment and Area Support	Pt Tracking	Medical Platoon Communications	Provide the medical platoon headquarters with integration to host communications devices to communicate with the patient tracking system, to include the receipt of casualty occurrence information originally obtained from Warfighter Physiological Status Monitor.	Compatible with FBCB2
C4I	Pt tracking	Digital Information System and Casualty Locator	Provide a digital information system and casualty locator system to rapidly assist others in locating and acquiring casualties.	Compatible with GCSS-A

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
C4I	Pt tracking	Interface with Patient Tracking System	Provide an interface between the Patient Tracking System and the personnel tracking system or with other ATCCS systems to exchange the following information: name, rank, SSN, current location, current condition, and time expected to reach destination medical facility.	Compatible with GCSS-A
Hospitalization	Pt Tracking	Notification	Provide access to a system for coordinating patient casualty information prior to arrival at the hospitalization unit.	Compatible with GCSS-A
C4I	Pt tracking	Real-time Information	Provide a system which provides real-time patient information regarding patient status, location, and access to medical records.	Compatible with GCSS-A/TMIP
C4I	Security	Firewall Security	Provide security procedures for information systems.	Security

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
C4I	Security	Virus Removal	Provide software capability to detect and remove viruses from the medical units computer systems.	Security
C4I	System	Non-Duplicative Digital Information System	Provide a digital information system and casualty locator system which must not duplicate nor conflict with all Warrior Systems (e.g. Land Warrior, Air Warrior, Mounted Warrior, etc.).	Compatible with Warrior Systems
C4I	Telemedicine	Telementoring Support	Provide access to telemedicine systems which will enable medical care providers to provide telementoring.	Telemedicine
C4I	Telemedicine	Teleconsulting Support	Provide access to telemedicine systems which will enable medical care providers to provide teleconsultation.	Telemedicine
Laboratory	Telemedicine	Digitalized Links	Provide access to telemedicine for forward Laboratory units.	Telemedicine

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Hospitalization	Telemedicine	Diagnostic Medical Images	Provide the ability to receive and transmit diagnostic medical images, high-resolution images, radiological images, dental images, patient, clinical, and laboratory systems data, and microscopic images.	Telemedicine
Hospitalization	Telemedicine	Integrated Hospital Information	Provide access to integrated hospital information systems to provide the deployed Medical Treatment Facility with full digital, voice, and video capability.	Telemedicine
Hospitalization	Telemedicine	Integrated Telemedicine	Provide access to integrated telemedicine information systems to provide the deployed Medical Treatment Facility with full digital, voice, and video capability.	Telemedicine
Hospitalization	Telemedicine	VTC	Provide hospital units with a consultation capability to communicate with health care providers.	Telemedicine

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Hospitalization	Telemedicine	Digital Radiography	Provide capability to store and transmit digital radiography.	Telemedicine
Patient Treatment and Area Support	Telemedicine	Telemedicine Access	Provide treatment teams (medical platoon and medical company) with access to a telemedicine system, operable over narrow communications bandwidth.	Telemedicine
Patient Treatment and Area Support	Telemedicine	Telemedicine Access	Provide treatment teams (medical platoon medical company, mental health, and combat stress control teams) with access to telemedicine referral/consultation templates.	Telemedicine
Patient Treatment and Area Support	Telemedicine	Digital Files	Provide treatment teams (medical platoon and medical company) with the ability to attach multimedia files containing patient information obtained from medical devices or digital camera.	Telemedicine

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Patient Treatment and Area Support	Telemedicine	Digital Images	Provide treatment teams (medical platoon and medical company) with the ability to accept input from digital cameras for still images.	Telemedicine
Patient Treatment and Area Support	Telemedicine	Telementoring	Provide treatment teams (medical platoon and medical company) with integration to host communications devices to communicate with health care providers wherever they are located; to include health care providers at the medical company, the Forward Surgical Team, the Combat Stress Control Detachment, and the Combat Support Hospital; to discuss patient management or for telemedicine use.	Telemedicine
Dental Services	Telemedicine	Seamless Connectivity among Health Providers	Provide access to telemedicine services (and/or CDROMS with video of unique procedures and anatomical systems).	Telemedicine

MEDICAL FUNCTIONAL AREA	CATEGORY	TITLE	REQUIREMENT	REFINED REQUIREMENT
Dental Services	Telemedicine	Access to Digital Radiographs	Provide access to digital Radiographs (dental images) for diagnostic and treatment purposes.	Telemedicine
Combat Stress Control	Telemedicine	Theater Telemedicine Capability	Provide access to in-theater CSC consultation and telemedicine communication capability to provide mutual support of deployed CSC personnel.	Telemedicine
Combat Stress Control	Telemedicine	Theater Consultation Capability	Provide access to in-theater CSC consultation and telemedicine communication capability to provide mutual support of deployed CSC personnel.	Telemedicine

ANNEX D

CRD/ORD KPP Cross walks/linkages

TMIP CRD - MC4 ORD KPP/Requirements Cross walk/linkage

TMIP CRD Requirements	MC4 ORD Requirements
Requirement 1 (KPP) - DII COE and Y2K compliance	KPP 2 - Para 4b(2)(a)i. MC4 hardware infrastructure must be able to run TMIP software and be DII-COE and Y2K compliant.
Requirement 2 - TMIP shall provide a consistent user interface.	This is a software requirement and doesn't apply to the MC4 hardware.
Requirement 3 (KPP) - TMIP shall provide security management services.	As a hardware system MC4 will not provide security management services. However, Para 4f addresses requirements for information assurance.
Requirement 4 (KPP) - Compatibility with Service infrastructure.	KPP 2 - Para 4b(2)(a)i. MC4 hardware infrastructure must be able to run TMIP software.
Requirement 5 (KPP) - Capability to operate in a severely constrained communications environment.	Para 4b(1)(d)i. MC4 must provide an alternate method of transferring medical data when telecommunications are interrupted or unavailable.

IDM CRD – MC4 ORD KPP/Requirements Cross walk/linkage

IDM CRD Requirements	MC4 ORD Requirements
Requirement 1 (KPP) Satisfy 100% of critical IERs to the threshold level (Threshold). Satisfy 100% of the IERs to the objective level of the attributes (Objective).	Para 4.b.(3)(a)i :Threshold: Meet 100% of the Critical Top Level Information Exchange Requirements (IERs) listed in Annex G (Top Level IERs). Objective: Meet 100% of the Top Level IERs listed in Annex G (Top Level IERs).
Requirement 2 (KPP) All data, that will be exchanged or has the potential to be exchanged, will be tagged IAW the current JTA standard for tagged data items (XML), COE Level 6 (Threshold Level 6 (Threshold) / Level 8 (Objective)).	Para 4b(2)(a)i : Software developed by MC4 must be tagged in accordance with JTA standards and in compliance with the Defense Information Systems Agency (DISA) registry.
Requirement 3 (KPP) IDM will support and enable dissemination of survival information in "n" sec (TBD) or less, 95% of the time (Threshold) and within "n" sec (TBD) 95% of the time (Objective).	MC4 will not carry "survival information" as defined by the IDM CRD. The MC4 information will fall in the IDM classification of "planning information."
Requirement 4 (KPP) IDM will ensure that information integrity will be maintained at 99.99% (Threshold) and at 99.999% (Objective).	This requirement applies to communication systems, rather than information systems. MC4 will pass data over the standard Army communications infrastructure and will have no control the transmission integrity of that infrastructure.
Requirement 5 (KPP) The information user will be able to acquire needed information by search queries.	MC4 will not have a query capability of its own. It will provide the hardware infrastructure to support

<p>Successful searches must yield 85% of available needed information, with no more than 20% of the total received being irrelevant/unusable information (waste) or failed searches (Threshold); and successful searches must yield 95% of available needed information, with no more than 10% of the total received being irrelevant/unusable information (waste) or failed searches (Objective).</p>	<p>queries made by the Joint TMIP software.</p>
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ANNEX E

GLOSSARY

PART I

ABBREVIATIONS AND ACRONYMS

ABCS - Army Battle Command System

AFATDS - Advanced Field Artillery Data System

AMEDD - Army Medical Department

ASAS - All Source Analysis System

ASAT - Automated Systems Approach to Training

ASI - Additional Skill Identifier

ASL - Authorized Stockage List

ASMB - Area Support Medical Battalion

ATCCS - Army Tactical Command and Control System

BAS - Battalion Aid Station

BDE - Brigade

BOS - Battlefield Operating Systems

CHLS - Combat Health Logistics System

CHPPM - Center for Health Promotion and Preventive Medicine

CHS - Combat Health Support

CINC - Commander In Chief

COE - Common Operating Environment

COMMS - Communications

CONUS - Continental United States

COTS - Commercial Off-The-Shelf

CRD - Capstone Requirements Document

CSC - Combat Stress Control

CSH - Combat Support Hospital

CSS - Combat Service Support

CSSAMO - Combat Service Support Automation Management Office

CSSCS - Combat Service Support Control System

C2 - Command and Control

C4I - Command, Control, Communications, Computers and Intelligence

C4ISR - Command, Control, Communications, Computers, Intelligence, Surveillance, and Reconnaissance

DC - Direct Current

DII - Defense Information Infrastructure

DISA - Defense Information System Agency

DIV - Division

DIA - Defense Intelligence Agency

DL - Distance Learning

DMS - Defense Message System

DMSO - Division Medical Supply Office

DNBI - Disease and Non-Battle Injury

DoD - Department of Defense

DOW - Died Of Wounds

DOS - Days Of Supply

DSMC - Division Support Medical Company

DTLOMS - Doctrine, Training, Leadership, Organization, Materiel and Soldiers

DTT - Doctrine Tactics Training

EAC - Echelons Above Corps

EAD - Echelons Above Division

ENT - Ears, Nose & Throat

ET - Embedded Training

E3 - Electromagnetic Environmental Effects

FAADC3I - Forward Area Air Defense Command, Control, Computers, and Intelligence

FBCB2 - Force XXI Battle Command Brigade and Below

FDC - First Digitized Corps

FDD - First Digitized Division

FOC - Future Operational Capabilities

FSMC - Forward Support Medical Company

GCCS-A - Global Command and Control System - Army

GCSS-A - Global Combat Support System - Army

GFE - Government Furnished Equipment

GOTS - Government Off-The-Shelf

GPS - Global Positioning System

HEMP - High-altitude Electromagnetic Pulse

HF - High Frequency

HFE - Human Factors Engineering

HHA - Health Hazard Assessment

IDEF - Integrated Definition

IER - Information Exchange Requirements

IKPT - Instructor Key Personnel Training

ILS - Integrated Logistics Support

IOC - Initial Operational Capability

IP - Internet Protocol

IS - Information Systems

ITDB-ODS - Interim Theater Database - Operational Data Store

ITDB-OLTP - Interim Theater Database - On-line Transaction

Processing

JTA - Joint Technical Architecture

JTF - Joint Task Force

KIA - Killed In Action

KPP - Key Performance Parameters

LAN - Local Area Network

LCCE - Life Cycle Cost Estimate

LDB - Local Database

LRU - Line Replaceable Units

MANPRINT - Manpower and Personnel Integration

MCS - Maneuver Control System

MC4 - Medical Communications for Combat Casualty Care

MC4I - Medical Command, Control, Communication, Computers, and Intelligence

MDT - Medical Detachment Telemedicine

MEDEVAC - Medical Evacuation

MEDLOG - Medical Logistics

MHS - Medical Health Service

MILCON - Military Construction

MMMB - Medical Material Management Branch

MNS - Mission Needs Statement

MOPP - Mission-Oriented Protective Posture

MOS - Military Occupational Specialty

MRI - Medical Reengineering Initiative

MTP - Mission Training Plans

NAIC - National Air Intelligence Center

NBC - Nuclear, Biological and Chemical

NET - New Equipment Training

OMS/MP - Operational Mode Summary/Mission Profile
OMA - Operational and Maintenance, Army
OPA - Other Procurement, Army
OPTEMPO - Operational Tempo
ORD - Operational Requirements Document
O&S - Operations and Support
OT&E - Operational Test and Evaluation
OTSG - Office of the Surgeon General
PAM - Pamphlet
PEO - Program Executive Office
EIC - Electronic Information Carrier
PM - Program Manager
PMCS - Preventive Maintenance Checks and Services
PMI - Patient Movement Item
RDTE - Research, Development, Test, And Evaluation
R&M - Reliability and Maintainability
RGL - Reading Grade Level
SASO - Stability and Support Operations
SET - System Extension Training
SMI - Soldier-Machine Interface
SMMP - System MANPRINT Management Plan
SSA - Supply Support Activity
STAMIS - Standard Army Management Information Systems
STRAP - System Training Plan
TAMMIS - Theater Army Medical Management Information System
TD - Training Developer
TDA - Table of Distribution and Allowances

TI - Tactical Internet

TMC - Troop Medical Clinic

TMDE - Tools and Test, Measurement, and Diagnostic Equipment

TMIP - Theater Medical Information Program

TOE - Table of Organization and Equipment

TRANSCOM - Transportation Command

TRAC²ES - TRANSCOM Regulating and Command and Control Evacuation System

TTP - Tactics, Techniques, and Procedures

WIN - Warfighter Information Network

WPSM - Warfighter Physiological Status Monitor

PART II

TERMS AND DEFINITIONS

CHS functional areas	- The 10 CHS functions include: Medical Command, Control, Communications, Computers and Intelligence (C4I); Medical Logistics and Blood Management; Preventive Medicine; Veterinary/Food Inspection Services; Laboratory Support/Environmental Hazards Testing; Hospitalization; Forward Casualty Resuscitation and Treatment/Area Support; Dental Health; Medical Evacuation; and Combat Stress Control support.
Combat Service Support Control System (CSSCS)	- CASCOS information management program designed to integrate and present all CSS data relevant to a commander.
Consolidated Health Care System - II (CHCS II)	- DoD Health Affairs information management program designed to track all in-patient medical information with a health care facility. Eventually will be used in both TDA and TOE facilities.
Defense Blood Standard System (DBSS)	- DoD Health Affairs information management program designed to track and manage theater blood and blood products for all Services.
Defense Medical Logistics Standard System (DMLSS)	- DoD Health Affairs information management program designed to manage and track all theater medical logistics for all Services.
Died of wounds (DOW)	- Death occurring after a casualty has reached medical care.
Disease, non-battle injury	- Disease of injuries not directly attributable to combat.

Echelon 1	- First responder care provided by buddy aid, Combat Life Saver, Combat Medic and Treatment Team (BAS w/PA and/or General Medical Officer)
Echelon 2	- Advanced Trauma Life Support (ATLS) by a PA/GMO in a Forward Support Medical Company (FSMC), Division Support Medical Company (DSMC), Area Support Medical Company (ASMC), or Brigade Support Medical Company (BSMC, I-Brigade).
Echelon 3	- Surgical and medical services with in-patient capability provided by Combat Support Hospital (CSH) and Forward Surgical Team (FST). FST can take echelon 3 level care forward when attached to a FSMC, DSMC, ASMC, or BSMC.
Echelon 4	- Surgical and medical services with an extended in-patient capability in a CSH (EAC)
Echelon 5	- Conus/Host Nation (HN) medical fixed facility.
Force XXI Battle Command, Brigade and Below (FBCB2)	- Armor Center information management program designed to integrate and display all C2 and CSS information relevant to maneuver Brigade and below operations.
Global Command and Control System (GCCS)	- Joint level information management program designed to integrate C2 systems from all Services.
Global Combat Support System - Army (GCSS-A)	- Army Material Command information management program designed to interface all of the various CSS business systems and provide a single link to the C2 systems.
Global Combat Support System (GCSS)	- Joint level information management program designed to integrate all CSS data from all Services.

Health surveillance	- Health surveillance is the routine, standardized tracking of disease and injury incidence in meaningful categories to drive prompt prevention and control actions.
Killed in action (KIA)	- Death occurring before a casualty has reached medical care.
Medical Detachment, Telemedicine (MDT)	- Specialized Corps/Theater medical unit that will field teams equipped with satellite and/or high frequency radio to support theater medical units with high bandwidth requirements until the WIN architecture is fully fielded. Will also provide on-site access to digitization equipment.
Medical Evacuation (MEDEVAC)	- The deliberate movement of casualties from one location to another.
Situational Awareness (SA)	- The state of understanding gained through decisions made from knowledge supplied by a graphical common picture of the battlefield consisting as a minimum of the: enemy situation, friendly situation, and the logistics situation.
Tactical Internet (TI)	- Army Combat Net Radio data network system for the support of Brigade and Below
Telemedicine	- Telemedicine provides on-site access to remote medical and allied health specialists for the purpose of consultations or procedural mentoring. Telemedicine uses voice, interactive video, still image, and text consultation to process requests from the supported medial treatment facility to appropriate health care specialists wherever they may be located.

Theater Medical Information Program (TMIP)	- Joint level information management program designed to integrate joint medical software into a common medical information system.
TRANSCOM Regulating and Command and Control Evacuation System (TRAC ² ES)	- TRANSCOM information management program designed to track theater and extra-theater medical facilities capabilities and match them with evacuee requirements. Will also track evacuees through the evacuation chain.
Warfighter Information Network (WIN)	- Future Army Area Common User System (ACUS) encompassing all data and voice systems in a Theater of operations.
Warfighter physiological status monitor (WPSM)	- A program under PM Soldier, the WPSM will be a suite of external worn sensors that monitor a soldier's vital signs. These sensors will feed the vital sign information to a body-worn computer where an artificial intelligence program will process the data and generate an alert if the vital signs fall outside of pre-set ranges. The alert will transmit a distress call to the platoon leader/platoon sergeant and medic.

ANNEX F

KPP SUMMARY

MC4 Key Performance Parameters

Key Performance Parameter	Threshold and Objective
Mobility	Threshold: The use of MC4 will not lengthen the normal set-up or tear-down time of any divisional medical unit. Objective: Same as threshold.
TMIP Software	Threshold: MC4 will be able to operate the TMIP software. Objective: MC4 will be able to operate the TMIP software and any software developed by the MC4 program will be fully compatible with the TMIP software.
Interoperability	Threshold: Meet 100% of the Critical Top Level Information Exchange Requirements (IERS) listed in Annex G (Top Level IERS). Objective: Meet 100% of the Top Level IERS listed in Annex G (Top Level IERS).

ANNEX G

MC4 INFORMATION EXCHANGE REQUIREMENT MATRIX

ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Read medical data from / write medical data to a PIC	Medical encounter data	Soldier's PIC	MC4 Computer	No	Data	<1 Min	U	Two way	2
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Read medical data from a soldier's WPSM	Vital sign data	Soldier's WPSM	MC4 Computer	No	Data	<1 Min	U	Potential interface if the Land Warrior program develops the WPSM	3
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4 TA 2.2 TA 5.1 TA 6.6	Update MC4 LDB	Patient encounter data, medical logistics data	MC4	MC4 LDB	Yes	Data, hard media	<12 Hours	U	Sent upon completion of medical transactions. May be carried via removable media when comms. not available.	1
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4 TA 2.2 TA 5.1 TA 6.6	Update TMIP ITDB	Patient encounter data, medical logistics data	MC4	TMIP ITDB	Yes	Data, hard media	<12 Hours	U	Sent upon completion of medical transactions. May be carried via removable media when comms. not available.	1
ST 4.2.2.4 ST 4.2.3 OP 5.3.4 SLT 6 SN 4.3.4	Query LDB or ITDB	Patient encounter data, medical logistics data	MC4 ITDB	MC4	Yes	Data	<5 Min	U	Two way. Queries are made by medical personnel for trend analysis.	1
ST 4.2.2.1 ST 4.2.2.3 OP 4.2.3.1 OP 4.2.3.3 SLT 4	Order medical supplies within theater	Medical logistics data	MC4	MC4	Yes	Data	<1 Hour	U	Two way. Class VIII supplies and blood products.	1

Rationale UJTL #	Event	Info Char	Sending Node	Receiving Node	Crit	Format	Timeliness	Class	Remarks	Block
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Exchange medical information with legacy medical information systems	Medical logistics data, patient regulating data, patient administration	TAMMIS	MC4	No	Data	< 1 Hour	U	Two way.	1
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Exchange medical information with garrison medical information systems	Patient encounter data, patient demographics data	CHCS	MC4	No	Data	<15 Min	U	Two way	1
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4 TA 6.4.1	Exchange information with joint patient regulating systems	Patient regulating data	TRAC2ES	MC4	No	Data	< 1 Hour	U	Two way.	1
ST 4.2.2.1 ST 4.2.2.3 OP 4.2.3.1 OP 4.2.3.3 SLT 4 TA 4.2	Order medical supplies from CONUS prime vendor	Medical logistics data	MC4	Prime vendor system	No	Data	<12 Hours	U	Two way. Class VIII supplies and blood products.	2
ST 4.2.3 OP 2.2 OP 5.1.3 SLT 5 TA 2.2 TA 5.1 TA 6.6	Update medical situational awareness	Medical situational data	MC4	GCSS-A	No	Data	<12 Hours	U	Interface will replace direct interface with CSSCS.	2
OP 4.2.3.3 SLT 4	Document medical maintenance	Medical maintenance data	MC4	GCSS-A	No	Data	<12 Hours	U	Two way. AMEDD will use the GCSS-A maintenance module for medical maintenance.	2

Rationale UJTL #	Event	Info Char	Sending Node	Receiving Node	Crit	Format	Timeliness	Class	Remarks	Block
OP 4.2.3.3 TA 4.2	Order medical supplies	Medical logistics data	FBCB2	MC4	No	Data	<1 Hour	U	Possible future FBCB2/MC4 interface.	3
ST 4.2.3 OP 2.2 OP 5.1.3 TA 2.2 TA 5.1 TA 6.6	Update medical unit status	Unit status data	FBCB2	MC4	No	Data	<1 Hour	U	Possible future FBCB2/MC4 interface.	3
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Send/Receive high density digital medical data	Digitized medical data	MDT, CONUS Hospital	MDT, CONUS Hospital	No	Data, images, sound	<12 Hours	U	Two way transmission of digitized images, sounds, and patient data.	2
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Teleconference - VTC	VTC	MDT, CONUS Hospital	MDT, CONUS Hospital	No	Video, voice, data	<5 Min	U	Two way video teleconferencing for patient consultation.	2
ST 4.2.2.1 ST 4.2.2.3 OP 4.2.3.1 OP 4.2.3.3 SLT 4	Order medical supplies from CONUS prime vendor	Medical logistics data	MC4	Prime vendor system	No	Data	<12 Hours	U	Two way. Class VIII supplies and blood products.	2
ST 4.2.3 OP 2.2 OP 5.1.3 SLT 5 TA 2.2 TA 5.1 TA 6.6	Update medical situational awareness	Medical situational data	MC4	GCSS-A	No	Data	<12 Hours	U		2

Rationale UJTL #	Event	Info Char	Sending Node	Receiving Node	Crit	Format	Timeliness	Class	Remarks	Block
OP 4.2.3.3 SLT 4	Document medical maintenance	Medical maintenance data	MC4	GCSS-A	No	Data	<12 Hours	U	Two way. AMEDD will use the GCSS-A maintenance module for medical maintenance.	2
OP 4.2.3.3 TA 4.2	Order medical supplies	Medical logistics data	FBCB2	MC4	No	Data	<1 Hour	U	Possible future FBCB2/MC4 interface.	3
ST 4.2.3 OP 2.2 OP 5.1.3	Update medical unit status	Unit status data	FBCB2	MC4	No	Data	<1 Hour	U	Possible future FBCB2/MC4 interface.	3
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Send/Receive high density digital medical data	Digitized medical data	MDT, CONUS Hospital	MDT, CONUS Hospital	No	Data, images, sound	<12 Hours	U	Two way transmission of digitized images, sounds, and patient data.	2
ST 4.2.2 ST 4.2.2.4 ST 4.2.3 OP 5.1.9 SN 4.3.4	Teleconference - VTC	VTC	MDT, CONUS Hospital	MDT, CONUS Hospital	No	Video, voice, data	<5 Min	U	Two way video teleconferencing for patient consultation.	2